United States Court of Appeals

for the Second Circuit

JOINT APPENDIX

76-4044

United States Court of Appeals
FOR THE SECOND CIRCUIT

No. 76-4044

BOC INTERNATIONAL LIMITED, f/k/a The British Oxygen Company Limited, BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, and BRITISH OXYGEN INVESTMENTS, LIMITED,

Petitioners,

—against—

FEDERAL TRADE COMMISSION,

Respondent.

No. 76-4045

AIRCO, INC.,

Petitioner,

—against—

FEDERAL TRADE COMMISSION,

Respondent.

ON PETITIONS FOR REVIEW OF AN ORDER
OF THE FEDERAL TRADE COMMISSION

JOINT APPENDIX, VOLUME 2
PAGES A328 TO A911
PAPERS FILED WITH THE COMMISSION

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Summary of Contents

Volume 1	Papers Filed with the Commission	A1
Volume 2	Papers Filed with the Commission	A328
Volume 3	Transcript	A912
Volume 4	Transcript	A1563
Volume 5	Transcript	A2219
Volume 6	Transcript	A2863
Volume 7	Exhibits	A3585
Volume 8	Exhibits	A4181
Volume 9	Exhibits	A4790
Volume 10	In Camera Filings	A5330

TABLE OF CONTENTS

PAGE

Volume 1—Papers Filed with the Commission

Docket Entries A1

Complaint dated Feb. 26, 1974, filed Feb. 26, 1974 ..... A16

Answer of Respondent Airco, Inc. dated March 11, 1974, filed March 12, 1974 ..... A29

Motion of BOC Respondents for a Subpoena Duces Tecum dated March 19, 1974, filed March 19, 1974 ..... A38

Supplement to Motion of BOC Respondents for a Subpoena Duces Tecum dated March 20, 1974, filed March 21, 1974.. A59

Complaint Counsel's Opposition to BOC Respondents' Motion for Subpoena Duces Tecum dated March 25, 1974, filed March 25, 1974 ..... A66

Complaint Counsel's Initial Request for Admission of Facts dated March 26, 1974, filed March 26, 1974 ..... A80

Complaint Counsel's Supplemental Memorandum in Opposition to BOC Respondents' Motion for Subpoena Duces Tecum dated April 1, 1974, filed April 1, 1974..... A92

Airco's Response to Complaint Counsel's Initial Request for Admission of Facts dated April 8, 1974, filed April 10, 1974 ..... A110

BOC's Response to Complaint Counsel's Initial Request for Admission of Facts dated April 8, 1974, filed April 12, 1974 ..... A116

PAGE

Order by Administrative Law Judge Barnes Ruling on Motion of BOC Respondents for a Subpoena Duces Tecum dated April 23, 1974, filed April 23, 1974 ..... A132

Application for Interlocutory Appeal of Administrative Law Judge's Rule Filed by Counsel for Chemetron Corporation dated April 29, 1974, filed May 1, 1974 ..... A223

Complaint Counsel's Application for Review of Order Requiring Production of Documents from the Commission Files dated April 29, 1974, filed April 29, 1974 ..... A228

Application of Liquid Air Inc. for Review of Order Ruling on Motion of BOC Respondents for a Subpoena Duces Tecum dated April 30, 1974, filed April 30, 1974 ..... A239

Appeal by Air Products and Chemicals, Inc. from the Ruling of Administrative Law Judge and Respondents' Motion for Subpoena dated April 30, 1974, filed April 30, 1974 .. A249

Application for Review and Appeal by Union Carbide Corporation of Ruling by Administrative Law Judge Requiring Production of Confidential Union Carbide Documents dated April 30, 1974, filed April 30, 1974 ..... A261

Interlocutory Appeal of Big Three Industries, Inc. from Ruling of Administrative Law Judge dated April 30, 1974, filed May 1, 1974 ..... A272

BOC Respondents' Answer to Applications for Review dated May 6, 1974, filed May 6, 1974 ..... A278

BOC Respondents' Response to Complaint Counsel's Supplemental Request for Admission of Facts dated May 13, 1974, filed May 13, 1974 ..... A294

PAGE

Amended Answer of BOC Respondents dated May 23, 1974, filed May 24, 1974 ..... A309

Order by the Commission Granting Applications for Review dated May 29, 1974, filed May 29, 1974 ..... A315

Order by Administrative Law Judge Barnes Incorporating into the Record Results of Informal Conference of June 10, 1974 dated June 17, 1974, filed June 17, 1974 ..... A317

BOC Response to Complaint Counsel's Offer of Documents from Stanford dated July 23, 1974, filed July 25, 1974 .... A319

Order by Administrative Law Judge Barnes Receiving Exhibits in Evidence dated Aug. 1, 1974, filed Aug. 1, 1974.. A324

Order by Administrative Law Judge Barnes Ruling on Proposed Exhibits dated Aug. 2, 1974, filed Aug. 2, 1974 .... A326

Volume 2—Papers Filed with the Commission

BOC Proposed Findings of Fact, Conclusions of Law and Order dated Aug. 2, 1974, filed Aug. 7, 1974 ..... A328

Airco Proposed Findings of Fact, Conclusions of Law and Brief dated Aug. 2, 1974, filed Aug. 5, 1974 ..... A681

Initial Decision of Administrative Law Judge Barnes dated Oct. 18, 1974, filed Oct. 18, 1974 ..... A729

Commission's Findings as to the Facts, Conclusions, Order and Opinion dated Dec. 8, 1975, filed Dec. 8, 1975 ..... A852

PAGE

Volume 3—Transcript

Pre-Trial Proceedings

March 12, 1974 ..... A912
March 28, 1974 ..... A942
April 17, 1974 ..... A993
April 25, 1974 ..... A1040

Witnesses Called by Complaint Counsel:

Alec Flamm

Direct Examination A1122
Cross Examination A1176
Redirect Examination A1257
Recross Examination A1264

Dexter Farrington Baker

Direct Examination A1277
Cross Examination A1338

William E. Dempster

Direct Examination A1429
Cross Examination A1466
Redirect Examination A1490

S. Michael Loveman

Direct Examination A1494
Cross Examination A1513
Redirect Examination A1529
Recross Examination A1531

Volume 4—Transcript

Witnesses Called by Complaint Counsel (cont'd):

Albert Muller

Direct Examination A1566
Cross Examination A1617

PAGE

Howard Heckel

Direct Examination A1648
Cross Examination A1658
Redirect Examination A1668

John Hines

Direct Examination A1670
Cross Examination A1679
Redirect Examination A1681

C. D. L. Perkins

Direct Examination A1697
Cross Examination A1717

Robert S. Johnson

Direct Examination A1745
Cross Examination A1759

Solomon P. Kimerling

Direct Examination A1773
Cross Examination A1799
Redirect Examination A1812

Thomas E. Cunningham

Direct Examination A1836
Cross Examination A1849
Redirect Examination A1867

Proceedings, May 14, 1974 ..... A1890

PAGE

Peter Schreiber

Direct Examination A1962
Cross Examination A2014
Redirect Examination A2043

Bernard K. Kuehn

Direct Examination A2046
Cross Examination A2090
Redirect Examination A2106

Dr. John Hedley-Whyte

Direct Examination A2113
Cross Examination A2158
Redirect Examination A2210
A2213
Recross Examination A2211
A2213

Volume 5—Transcript

Witnesses Called by Complaint Counsel (cont'd):

Gary Porter

Direct Examination A2219
Cross Examination A2249
Redirect Examination A2265
Recross Examination A2271

Robin A. Scott

Direct Examination A2273
Cross Examination A2284

Proceedings, May 22, 1974 ..... A2305

PAGE

Proceedings, May 23, 1974 ..... A2338

Witnesses Called by BOC Respondents:

Leslie Edward Smith

Direct Examination A2393
Cross Examination A2555
Redirect Examination A2621
A2652
Recross Examination A2641

Richard V. Giordano

Direct Examination A2654
Cross Examination A2739
Redirect Examination A2779
Recross Examination A2788

Ray Dow

Direct Examination A2796
Cross Examination A2809
Redirect Examination A2817
A2821
Recross Examination A2818

Albert W. Karnath

Direct Examination A2824
Cross Examination A2844

Volume 6—Transcript

Witnesses Called by BOC Respondents (cont'd):

Andrew G. Kridl

Direct Examination A2873
Cross Examination A2980
Redirect Examination A3011
Recross Examination A3017

PAGE

Ray D. Cosgrove

Direct Examination A3042
Cross Examination A3180
Redirect Examination A3285
Recross Examination A3292

Peter Laister

Direct Examination A3300

Witness Called by Respondent Airco, Inc.:

George S. Dillon

Direct Examination A3355
Cross Examination A3376
Redirect Examination A3384

Witnesses Called by BOC Respondents (cont'd):

Peter Laister (cont'd)

Cross Examination A3385
Redirect Examination A3471

Rebuttal Witness Called by Complaint Counsel:

Dexter Farrington Baker (Rebuttal)

Direct Examination A3497
Cross Examination A3543
Redirect Examination A3572
A3573
Recross Examination A3573
A3574

PAGE

Volume 7—Exhibits

Exhibits Offered by Counsel Supporting the Complaint

CX 3	1966 Directors' Report and Accounts of British Oxygen Company Limited	A3585
CX 6	1968 Directors' Report and Accounts of British Oxygen Company Limited	A3614
CX 9	1970 Directors' Report and Accounts of British Oxygen Company Limited	A3640
CX 10	1971 Directors' Report and Accounts of British Oxygen Company Limited	A3674
CX 11	1972 Directors' Report and Accounts of British Oxygen Company Limited	A3712
CX 12	Sept. 29, 1967 Agreement between British Oxygen Company Limited and Air Reduction Company, Incorporated including attached exhibits A through F and Appendices A and B	A3750
CX 14	Oct. 1, 1968 Report on Visit of Sept. 24, 1968, to Gardner Cryogenics Corporation prepared by J. A. Perham and A. Muller	A3856
CX 15	August 11, 1968 BOC confidential report (PLS/JMD/50) on Gardner Cryogenics Corporation	A3861
CX 17	Dec. 30, 1968 letter from Albert Muller to Leslie Smith of BOC	A3895
CX 18	Jan. 10, 1969 Report of 1968 Consulting Activity by Albert Muller	A3896
CX 19	Jan. 24, 1969 letter with three attachments from Albert Muller to Dr. Nicol Gross of BOC	A3911

		PAGE
CX 23	March 28, 1969 letter from Albert Muller to L. E. Smith of BOC	A3916
CX 25	April 1, 1969 letter from Leslie Smith of BOC to Dr. A. Muller	A3919
CX 26	April 28, 1969 BOC report—Proposed Visit to USA by D. A. D. Morgan, with attached Oct. 6, 1969 BOC report—Visit to North America by D. A. D. Morgan	A3922
CX 27	April 29, 1969 letter to D. W. E. Stafferton of Cricklewood and J. A. Perham, of Canox	A3951
CX 29	May 14, 1969 report—Guidelines for BOC Group Activities, prepared by J. A. Perham and A. Muller	A3953
CX 31	June 25, 1969 letter from Albert Muller to L. E. Smith of BOC	A3958
CX 34	July 8, 1969 letter from J. A. Perham of Canox to Kevin J. Bradley of Dean Witter & Co.	A3960
CX 35	July 24, 1969 letter from Albert Muller to L. E. Smith of BOC with attached invoices	A3961
CX 36	Aug. 18, 1969 memorandum from L. E. Smith, BOC Group Managing Director, to Managing Directors, Chief Executives, J. A. Perham, and H. S. Rich	A3965
CX 37	Aug. 26, 1969 letter from J. A. Perham, president of Canox, to H. S. Rich of BOC	A3967
CX 38	Aug. 22, 1969 memorandum from H. S. Rich of BOC to J. A. Perham of Canox with attached report: BOC and the U.S.A.—A Paper for Discussion, dated August 20, 1969 with appendices A-E	A3970

		PAGE
CX 40	September 4, 1969 memorandum—BOC Group Activities in North America, prepared by J. A. Perham	A4002
CX 41	Sept. 23, 1969 letter from I. Greenfield of BOC to Dr. A. Muller	A4005
CX 42	Oct. 21, 1969 letter from Albert Muller to L. E. Smith of BOC	A4006
CX 43	Oct. 21, 1969 BOC Management Bulletin No. 59	A4008
CX 44	Nov. 6, 1969 BOC report—Industrial and Medical Gases in the U.S.A.—Statistics and Other Information, with attached appendices 1-7	A4011
CX 45	Dec. 1, 1969 letter from A. Muller to L. E. Smith of BOC	A4137
CX 46	Nov. 19, 1969 letter from A. Muller to R. C. Hesketh-Jones of BOC	A4139
CX 47	Dec. 3, 1969 letter from Leslie Smith of BOC to Dr. A. Muller	A4140
CX 48	Dec. 19, 1969 letter from Albert Muller to L. E. Smith of BOC with attached invoices	A4142
CX 49	July 22, 1971 Agreement between BOC and Airco with attached Exhibit A	A4145
CX 50	Oct. 9, 1974 BOC confidential report—The North American Market for BOC Medical Products, prepared by R. J. Williams	A4156

PAGE

Volume 8—Exhibits

CX 63 April 12, 1973 minutes prepared by P. Laister of BOC of meeting in St. Louis on April 6, 1973 re: proposed Emerson acquisition of Harris Calorific A4181

CX 70 June 1, 1973 BOC memorandum from J. A. Perham to P. Laister A4183

CX 72 June 22, 1973 BOC confidential report ("R" no. 157) A4186

CX 75 June 27, 1973 BOC confidential report ("R" no. 159) prepared by H. S. Rich A4200

CX 85 Undated extract from BOC Board Meeting Minutes from Company Secretary accompanying July 11, 1973 report, Project "Blindfold" from Group Strategy office, with appendix consisting of extracts from 1972 Airco Form 10-K and from Airco Report to Stockholders dated May 28, 1973 A4211

CX 88 July 19, 1973 BOC memorandum re: "Blindfold", to J. M. Williams and P. Laister from company secretary, C. A. B. Leslie and attached draft letter A4239

CX 99 Nov. 7, 1973 BOC memorandum to P. G. Bosonnet from Mrs. T. Fuller with attachment: July 30, 1973 transmittal slip to C. A. B. Leslie from P. G. Bosonnet, accompanying July 25, 1973 letter agreement executed by Richard V. Giordano of Airco and Peter Laister of BOC A4242

		PAGE
CX 101	Oct. 10, 1973 BOC memorandum from James N. Hiddleston to Mr. P. Laister and Mr. A. I. Ray	A4246
CX 102	Oct. 15, 1973 Organization Plans for Medishield	A4249
CX 107	Nov. 22, 1973 BOC memorandum from Ralph C. Hopton to P. Laister and A. I. Ray	A4257
CX 108	Dec. 10, 1973 Memorandum Agreement (Exhibit C) between The British Oxygen Company Ltd. and Airco, Inc.	A4258
CX 109	Jan. 30, 1974 letter from Peter F. Gold of Paul, Weiss, Rifkind, Wharton & Garrison, to Gordon Youngwood, Federal Trade Commission, with enclosures 1-5	A4261
CX 110	Jan. 24, 1974 letter from Peter F. Gold of Paul, Weiss, Rifkind, Wharton & Garrison, to Gordon Youngwood, Federal Trade Commission, with enclosure no. 1	A4274
CX 111	April 25, 1968 consultant agreement executed by C. A. B. Leslie, secretary of BOC, and Dr. Albert Muller	A4281
CX 112	March 20, 1970 letter from Albert Muller to L. E. Smith of BOC	A4285
CX 113	April 21, 1970 letter from J. H. Williams of BOC to Dr. A. Muller	A4287
CX 114	April 22, 1970 BOC memorandum from J. H. Williams to Dr. J. B. Gardner and Mr. H. S. Rich	A4288
CX 115	Aug. 17, 1971 letter from Mr. C. D. L. Perkins of Burdett Oxygen Company to J. M. Williams, managing director of BOC	A4289

		PAGE
CX 116	Sept. 6, 1971 letter from J. M. Williams of BOC to C. D. L. Perkins of Burdett Oxygen Company responding to letter of Aug. 17, 1971	A4291
CX 117	Nov. 16, 1971 letter from I. Temple Roberts of BOC to C. D. L. Perkins of Burdett Oxygen Company	A4292
CX 118	Feb. 1, 1974 letter from Peter F. Gold of Paul, Weiss, Rifkind, Wharton & Garrison to Gordon Youngwood, Federal Trade Commission	A4293
CX 121	February 20, 1970 letter to N. F. J. Reckitt of BOC from Albert Muller	A4294
CX 122	Jan. 20, 1970 letter to L. E. Smith of BOC from Albert Muller with attached invoices	A4296
CX 125	Dec. 10, 1973 Schedule 13D with attached Exhibits A-D and Exhibits 1-5, filed with Securities and Exchange Commission by BOC	A4299
CX 127	July 24, 1973 Checklist for Airco/BOC Discussions—July 25-27, 1973, prepared by D.M.M.	A4356
CX 130	Undated cover sheet for catalog—Fraser Sweatman Incorporated Products for Anesthesia, prepared by Fraser Sweatman, Inc.	A4362
CX 131	Undated catalog extract—Quantiflex R. F., prepared by Fraser Sweatman, Inc.	A4363
CX 132	Undated catalog extract—Fluotec Mark II Vaporizers, prepared by Fraser Sweatman, Inc.	A4369

		PAGE
CX 133	Undated catalog extract—The FS Pin Safety System for Volatile Agents, prepared by Fraser Sweatman, Inc.	A4392
CX 135	Undated catalog extract—AE Vaporizer, FS-713, prepared by Fraser Sweatman, Inc.	A4398
CX 139	Jan. 10, 1972 catalog extract—The Pentec Mark II for Penthrane, prepared by Fraser Sweatman, Inc.	A4400
CX 140	Undated catalog extract—Conductiflex Accessories, prepared by Fraser Sweatman, Inc.	A4406
CX 141	Jan. 10, 1972 catalog extract—Fluotec Mk II for Fluothane, prepared by Fraser Sweatman, Inc.	A4408
CX 146	May 1, 1972 Fraser Sweatman Hospital Anesthesia Products Price Sheet, prepared by Fraser Sweatman, Inc.	A4414
CX 147	Undated catalog—Fraser Sweatman Incorporated, Veterinary Anesthesia Equipment Catalog, prepared by Fraser Sweatman, Inc.	A4433
CX 148	Undated catalog extracts—Quantiflex RA Relative Analgesia Machine; Automatic Change-Over Manifold System; Manual Manifold System; Knight Guard bulletin KG-871; Other Products for Dentistry Available from Fraser Sweatman; Regulators, Hose Assemblies; Rubber Goods & Accessories; prepared by Fraser Sweatman, Inc.	A4445
CX 150	Feb. 29, 1972 product catalog prepared by Harris-Lake, Inc.	A4455

		PAGE
CX 170	Jan. 14, 1974 Airco Management Newsletter	A4513
CX 172	1967 Airco Annual Report	A4517
CX 175	1970 Airco Annual Report	A4556
CX 176	1971 Airco Annual Report	A4595
CX 177	1972 Airco Annual Report	A4631
CX 207	Oct. 2, 1968 letter from J. A. Perham to L. E. Smith of BOC transmitting Sept. 24, 1968 report on visit to Gardner Cryogenics Corporation, prepared by J. A. Perham and A. Muller	A4687
CX 208	Oct. 31, 1968 report—Canox Long-Range Plan, prepared by J. A. Perham	A4694
CX 209	May 16, 1969 letter from R. C. Hesketh-Jones of BOC to J. A. Perham of Canox ..	A4736
CX 210	June 9, 1969 memorandum of telephone conversation with Richard de La Chapelle and Kevin J. Bradley of Dean Witter & Co., prepared by J. A. Perham	A4737
CX 213	June 11, 1969 memorandum from J. A. Perham to R. C. Hesketh-Jones accompanying May 28, 1969 memorandum of meeting with representatives of Dean Witter & Co., prepared by R. W. Stevens	A4738
CX 214	June 20, 1969 letter from R. C. Hesketh-Jones of BOC to President, Canox	A4747
CX 216	July 7, 1969 letter from J. A. Perham, President, Canox, to R. C. Hesketh-Jones of BOC	A4748

		PAGE
CX 217	Nov. 12, 1969 restricted memorandum (PLS 69/34)—The USA—BOC Group Policies ..	A4749
CX 218	Dec. 1, 1969 restricted memorandum (PLS 69/36) — BOC and Chemetron — General Notes	A4757
CX 221	Dec. 18, 1969 letter from J. M. Williams to R. Johnson of Loeb, Rhoades & Co.	A4771
CX 222	Jan. 5, 1970 memorandum from H. S. Rich to J. M. Williams	A4772
CX 223	Jan. 12, 1970 memorandum—Visit to Chemetron, Jan. 8, 1970, prepared by J. M. Williams	A4773
CX 224	Jan. 16, 1970 letter from Robert S. Johnson of Loeb, Rhoades & Co. to John M. Williams of BOC	A4776
CX 225	Jan. 20, 1970 letter from L. E. Smith to J. A. Perham	A4777
CX 226	Jan. 22, 1970 letter from J. M. Williams to Robert S. Johnson of Loeb, Rhoades & Co.	A4779
CX 227	Jan. 28, 1970 letter from J. M. Williams to J. A. Perham of Canox	A4780
CX 228	Feb. 26, 1970 letter from Albert Muller to Leslie E. Smith of BOC	A4781
CX 229	Feb. 26, 1970 letter from Albert Muller to N. F. J. Reckitt of BOC	A4782
CX 230	April 21, 1970 letter from J. M. Williams to Dr. A. Muller	A4784

PAGE

CX 233 April 28, 1970 letter from P. J. Grant of Lazard Brothers & Co. to J. M. Williams of BOC accompanying report of Burdett Oxygen Co. of Cleveland A4785

CX 234 April 30, 1970 letter from J. M. Williams to P. J. Grant of Lazard Brothers & Co. A4788

CX 242 June 2, 1970 letter from P. J. Grant of Lazard Brothers & Co. to J. M. Williams of BOC A4789

Volume 9—Exhibits

CX 243 June 3, 1970 letter from J. M. Williams to P. J. Grant of Lazard Brothers & Co. A4790

CX 244 Sept. 23, 1970 typewritten note attached to Sept. 8, 1970 letter from J. A. Perham to L. E. Smith of BOC A4791

CX 245 Oct. 9, 1970 letter from J. A. Perham to S. Michael Loveman, President, Burdett Oxygen Co. of Cleveland A4793

CX 246 Nov. 11, 1969 memorandum — Notes on Meeting at Hammersmith House—3 Oct. 1969, prepared by R. C. Hesketh-Jones A4794

CX 247 June 16, 1969 letter from J. A. Perham to Kevin J. Bradley of Dean Witter & Co. ... A4795

CX 248 Oct. 21, 1969 letter from Albert Muller to J. Allan Perham of Canadian Oxygen Ltd. .. A4796

CX 249 October 13, 1970 letter from S. Michael Loveman of Burdett Oxygen Co., Cleveland to J. A. Perham, President, Canadian Oxygen Ltd. A4798

		PAGE
CX 250	Aug. 1, 1971 memorandum from J. M. W. Entitled "Norristown, Pa., C. D. L. Perkins, Executive Vice-President, 11 August, 1971"	A4799
CX 251	Aug. 26, 1971 memorandum from D W. N. Pitts, GWH to J. M. Williams	A4802
CX 257	Oct. 18, 1971 letter from I. Temple Roberts to C. D. L. Perkins, Burdett Oxygen Co., Norristown	A4803
CX 258	Nov. 16, 1971 letter from I. Temple Roberts to C. D. L. Perkins, Burdett Oxygen Co., Norristown	A4804
CX 268	Jan. 9, 1973 BOC memorandum from James N. Hiddleston to A. I. Ray	A4805
CX 289	Oct. 17, 1973 letter from A. R. Dow to S. M. Loveman, Burdett Oxygen Company, Cleveland	A4806
CX 292	1973 Directors' Report and Accounts of British Oxygen Company, Ltd.	A4807
CX 293	March 14, 1974 letter from BOC to the Ordinary Shareholders with appendices I and II	A4845
CX 296	1972 Census of Manufactures, Industry Series, Industrial Gases SIC 2813	A4863
CX 298	Form MC-28B 1972 Census of Manufactures, Industrial Gases	A4869
CX 299	Instruction Manual for Current Industrial Reports for reporting on Form MA-28E.2 for Industrial Gases (Shipments and Productions) Annual Report	A4877

		PAGE
CX 300	Bureau of Census, Current Industrial Report form MA-28E.2	A4881
CX 312	U.S. Department of Commerce Current Industrial Report for Industrial Gases (SIC 2813), Series M28-C(72)-14 dated July 1973	A4889
CX 335	Liquid Air Corp. of North America S-1	A4900
CX 342	SRI Report Extract	A4980
CX 343	1972 Census of Manufactures SIC 2869 Industrial Organic Chemicals	A4986
CX 344	1972 Census of Manufactures SIC 2911 2922 Petroleum Refining	A4998
CX	Physical Exhibit A—Ohio Medical Products Catalog (excerpts)	A5009

Exhibits Offered by BOC Respondents

BOC RX 2	Photograph of interior, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5037
BOC RX 3	Photograph of storage area, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5038
BOC RX 4	Photograph of exterior front, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5039
BOC RX 5	Photograph of exterior side, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5040
BOC RX 6	Photograph of manufacturing area, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5041
BOC RX 7	Photograph of manufacturing area, Harris-Lake, Inc., 10910 Briggs Rd., Cleveland, Ohio	A5042

		PAGE
BOC RX 9	Photograph of the basement engineering office, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5043
BOC RX 10	Photograph of the dental machine assembly, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5044
BOC RX 11	Photograph of machine shop, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5045
BOC RX 12	Photograph of dental machine assembly, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5046
BOC RX 13	Photograph of engineering office, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5047
BOC RX 14	Photograph of engineering office, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5048
BOC RX 15	Photograph of stock room, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5049
BOC RX 16	Photograph of machine shop, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5050
BOC RX 17	Photograph of quality control room, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5051
BOC RX 18	Photograph of quality control room, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5052
BOC RX 19	Photograph of veterinary machine assembly, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5053

		PAGE
BOC RX 20	Photograph of exterior, Fraser Sweatman, Inc., 5490 Broadway, Lancaster, N. Y.	A5054
BOC RX 31	Big Three Industries, Inc. 1973 Annual Report	A5055
BOC RX 35	Burdett Oxygen Co. of Cleveland, Inc.—Annual Report for the year ended February 28, 1973	A5075
BOC RX 53	Census Bureau, Current Industrial Reports—Industrial Gases 1972	A5094
BOC RX 56	American Iron and Steel Institute 1972 Report—Table re: Oxygen Consumption	A5106
BOC RX 57	May 16, 1968, R. C. Hesketh-Jones, "Group Objectives Part I: The Future Development of BOC as an International Concern"	A5109
BOC RX 60	Sept. 12, 1969 "BOC and the USA—A Paper for Discussion"	A5117
BOC RX 61	Oct. 14, 1969 letter from J. A. Perham to S. M. Loveman	A5144
BOC RX 72	1967 Census of Manufactures, Vol. 1	A5145
BOC RX 181	BOC Chairman's Committee Nov. 27, 1969 Minutes re: "Study of USA Market".....	A5153
BOC RX 184	Jan. 4, 1974 Press Notice, Department of Trade and Industry	A5157
BOC RX 185	Jan. 5, 1974 letter from J. C. Mather to C. A. B. Leslie	A5158
BOC RX 187	Union Carbide—1972 Annual Report	A5159
BOC RX 188	Union Carbide—1973 Annual Report	A5184
BOC RX 189	Table of Shipments—Acetylene—1963-1972	A5207

		PAGE
BOC RX 190	Table of Unit Value—Shipments—Acetylene—1963-1972	A5208
BOC RX 191	Table of Shipments and Unit Value—Argon—1963-1972	A5209
BOC RX 192	Table of Shipments—Carbon Dioxide—1963-1972	A5210
BOC RX 193	Table of Unit Value—Shipments—Carbon Dioxide—1963-1972	A5211
BOC RX 194	Table of Shipments—Nitrogen—1963-1972	A5212
BOC RX 195	Table of Shipments and Unit Value—Hydrogen—1963-1972	A5213
BOC RX 196	Table of Unit Value—Shipments—Nitrogen—1963-1972	A5214
BOC RX 197	Table of Shipments and Unit Value—Nitrous Oxide—1963-1972	A5215
BOC RX 198	Table of Shipments—Oxygen—1963-1972	A5216
BOC RX 199	Table of Unit Value—Shipments—Oxygen—1963-1972	A5217
BOC RX 200	Document consulted by Dr. Hedley-Whyte during direct examination	A5218
BOC RX 206	June 1, 1970 Report on visit to Carpenter Technology by Perham and Muller	A5219
BOC RX 208	U.S. Dept. of Commerce, *U.S. Industrial Outlook*, 1974	A5222
BOC RX 222	Sept. 29, 1972, R. C. Hesketh-Jones, Consultation BOC-Overseas Companies	A5224
BOC RX 223	July 21, 1972, R. C. Hesketh-Jones, Overseas Company Boards	A5227

		PAGE
BOC RX 228	Program for the American Society of Anesthesiologists Annual Meeting, Oct.7-11, 1973	A5231
BOC RX 234	May 19, 1970 Letter from D. R. Harris to J. A. Perham	A5249
BOC RX 243	Percent Return on Total Invested Capital	A5250
BOC RX 244	Percent Return on Stockholders' Equity	A5251
BOC RX 246	Graphs of gas volume, quantity and unit price	A5252
BOC RX 260	Perry paper on oxygen and nitrogen (not in evidence)	A5265
BOC RX 261	American Iron & Steel Institute 1973 Report (not in evidence)	A5271

Exhibit Offered by Respondent Airco, Inc.

RAX 7	Airco Annual Report for 1973	A5274

Volume 10—In Camera Filings*

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* The Table of Contents for Volume 10 appears only in that volume.

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

In the Matter of BRITISH OXYGEN COMPANY, LIMITED, BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, BRITISH OXYGEN INVESTMENTS, LIMITED, AIRCO, INCORPORATED.	Docket No. 8955

PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER
(In Camera Material Deleted)

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TABLE OF CONTENTS

	Page
Table of Figures	xii
Summary of Proceedings	1
Proposed Findings of Fact	5
The Respondents	5
BOC	5
Airco	7
BOC's Acquisition of An Interest in Airco	8
PART I - INDUSTRIAL GASES	9
Proposed Findings of Fact As to Industrial Gas	9
(1) Definitions	9
(2) Are "Industrial Gases" a Product Market?	12
A. The Uses of Gases and Their Lack of Substitutability	12
B. Methods of Production	16
C. Distinct Prices	18
D. Sensitivity to Price Changes	19
E. Industry Recognition	19
F. Full Line or Partial Line Production and Marketing	22
G. Marketing Staffs	26

Page

(3) Structure and Economic Performance of the Industrial Gas Industry..... 27

A. Distribution Structure of the Industrial Gas Industry..... 27

B. Production and Marketing of Industrial Gases..... 31

1. Industrial Gas Companies..... 31

2. Other Industrial Gas Producers..... 32

(a) Backward-Integrated Tonnage Users..... 32

(b) Industrial Gases Produced as By-Products of Chemical Processes..... 38

3. Distributors..... 39

C. Competition and Economic Performance in the Industrial Gas Industry..... 41

1. Price Competition..... 41

2. Structural Factors Ensuring Price Competition and Limiting Prices In the Industrial Gas Industry..... 60

(a) Backward Integration By Tonnage Users..... 61

(b) The Cost Structure of the Industrial Gas Industry..... 67

(c) Concentration and Economic Power On the Buyers' Side..... 68

(d) Product Homogeneity..... 71

3. Profitability of the Industrial Gas Companies..... 71

Page

4. Innovation..... 75

5. Capacity-Output Relationships..... 75

6. Concentration..... 76

(4) Geographic Markets..... 88

A. Tonnage Gas..... 88

B. Merchant Gas..... 89

(5) Was BOC a Perceived Potential Entrant Exerting a Pro-competitive Effect From the Fringe of the Market?..... 91

A. Was BOC Perceived to Be A Probable Entrant?..... 91

B. Did BOC Exert a Pro-Competitive Effect From the Fringe of the Market?..... 97

1. Testimony of Industry Witnesses..... 97

2. Was BOC the Most Likely Entrant?..... 100

(a) Tonnage Users..... 100

(b) Messer Griesheim..... 101

(c) Linde A.G..... 102

(d) AGA..... 103

C. Conclusions..... 104

(6) Would BOC Have Entered the United States Industrial Gas Field But For Its Acquisition of an Interest in Airco?..... 105

		Page
A.	Testimony of BOC Executives.....	105
B.	Contemporaneous BOC Documents.....	108
	1. The Perham-Greenfield Report.....	108
	2. BOC's Budget and Priorities After The Perham-Greenfield Report.....	110
	3. Other Documents.....	113
	4. BOC's Conduct after Perham-Greenfield.....	114
C.	Barriers to De Novo Entry.....	117
	1. Cost.....	117
	2. Backup.....	119
	3. Long Term Contracts.....	121
	4. Economies of Scale.....	122
D.	Was Entry by Acquisition of a Firm Smaller than Airco Feasible and Economically Attractive?.....	124
	1. The Smaller Firms In the Industry.....	124
	(a) Chemetron.....	124
	(b) Liquid Air, Inc.....	126
	(c) Liquid Carbonic.....	129
	(d) Big Three.....	129
	(e) Burdett of Cleveland.....	131
	(f) Alabama Oxygen Company.....	134

Page

(g) Burdett Oxygen Company (Norristown)..... 135

(h) Northern Gases and Supply Co..... 137

(i) Other Firms..... 138

2. Entry by Acquisition and Development of Small Firms..... 139

(a) Availability..... 139

(b) Cost of Development..... 140

(c) Backup..... 141

(d) Economies of Scale..... 141

3. Entry by Acquisition and Development of Intermediate-Sized Firms..... 142

(a) Availability..... 142

(b) Cost of Acquisition..... 143

(c) Cost of Expansion and Other Barriers to Development..... 145

E. Would BOC Have Entered The United States From Canada?..... 145

F. Airco Was a Unique Opportunity for BOC..... 149

G. Conclusions..... 154

(7) Conclusions -- The Competitive Effects of Entry by BOC..... 159

A. Competitive Effects of BOC's Acquisition of an Interest in Airco..... 159

Page

B. Assuming BOC had Not Acquired an Interest in Airco, Would It Have Been Likely to Enter the United States and to Increase Competition in the Industrial Gas Industry?..... 162

ARGUMENT..... 164

I COMPLAINT COUNSEL HAVE FAILED TO DEMONSTRATE THAT BOC WAS A PERCEIVED POTENTIAL ENTRANT EXERTING A PRO-COMPETITIVE EFFECT FROM THE FRINGES OF THE INDUSTRY..... 164

A. Complaint Counsel Have Not Demonstrated That BOC was Perceived as Reasonably Likely to Enter..... 165

B. The Competitive Behavior of The Industrial Gas Industry Was Not Affected by BOC..... 168

II COMPLAINT COUNSEL HAVE FAILED TO SHOW THAT BOC WAS AN ACTUAL POTENTIAL ENTRANT WHOSE ENTRY WOULD HAVE BEEN LIKELY TO LEAD TO FURTHER DECONCENTRATION OF THE INDUSTRY OR OTHER SIGNIFICANT PRO-COMPETITIVE EFFECTS..... 174

A. BOC Was Not Shown to Be Reasonably Likely to Enter Other Than by Acquisition of an Interest in Airco..... 175

B. In Any Event, There Was No Showing that De Novo or Toehold Entry by BOC Would have Improved Competition in the Industry..... 185

III THE DOCTRINE OF POTENTIAL COMPETITION DOES NOT APPLY TO THIS HIGHLY COMPETITIVE INDUSTRY..... 189

Page

A. Complaint Counsel Have Failed to Show that the Industrial Gas Industry Is Sufficiently Concentrated to Make a Prima Facie Case for Application of the Potential Competition Doctrine..... 190

1. The Evidence of Concentration Relied Upon by Complaint Counsel is Incomplete and Unreliable.... 191

2. Even if Complaint Counsel's Evidence of Concentration Were Accepted, the Industrial Gas Industry Is Not Sufficiently Concentrated to Invoke the Doctrine of Potential Competition..... 199

B. In Any Event, The Industrial Gas Industry is "Genuinely Competitive" and the Doctrine Therefore Inapplicable..... 206

IV THIS ACQUISITION DOES NOT VIOLATE SECTION 7 EVEN IF BOC WERE AN ACTUAL POTENTIAL ENTRANT WHOSE ENTRY WOULD HAVE BEEN LIKELY TO LEAD TO SIGNIFICANT PRO-COMPETITIVE EFFECTS..... 210

V COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT "INDUSTRIAL GASES" CONSTITUTE A RELEVANT LINE OF COMMERCE UNDER SECTION 7..... 214

VI COMPLAINT COUNSEL HAVE FAILED TO IDENTIFY OR PROVE A RELEVANT GEOGRAPHIC MARKET..... 229

Page

PART II - MEDICAL EQUIPMENT..... 236

Proposed Findings of Fact as to Medical Equipment..... 236

(1) Definitions..... 236

(2) Respondents' United States Medical Equipment Businesses..... 237

A. BOC..... 237

1. Harris Lake, Inc..... 237

2. Fraser Sweatman, Inc..... 239

3. Medishield, Inc..... 241

B. Airco -- Ohio Medical Products Division..... 241

(3) Are Inhalation Anesthetic Equipment And Inhalation Therapy Equipment Relevant Product Markets?..... 243

A. Inhalation Anesthetic Equipment And Accessories..... 243

1. The Products..... 243

Listed by Complaint Counsel..... 243

Added by Companies Responding..... 250

Mentioned in Hearings but not In Subpoena Responses..... 252

2. Product Interchangeability..... 254

3. Prices and Price Sensitivity..... 255

4. Production Processes and Equipment..... 256

Page

5. Specialization in Manufacturing and Distribution..... 257

B. Inhalation Therapy Equipment and Accessories... 258

1. The Products..... 258

Listed by Complaint Counsel..... 259

Added in the Hearings..... 261

2. Product Interchangeability..... 262

3. Prices and Price Sensitivity..... 263

4. Production Processes and Equipment..... 263

5. Specialization in Manufacturing and Distribution..... 263

6. Industry or Public Recognition..... 263

(4) Geographic Market..... 265

(5) Structure of the Alleged Markets..... 266

A. Inhalation Anesthetic Equipment and Accessories..... 266

1. Manufacturing and Importing..... 266

2. Distribution..... 271

3. New Entrants into the Inhalation Anesthetic Equipment Field..... 273

4 Concentration and Market Shares..... 274

(a) Sales of Respondents..... 275

(b) Sales of Other Firms..... 277

Page

(c) Ranking of Firms..... 281

(d) Size of the Field..... 282

(e) Shares of Manufacturer-Level Sales in the Field..... 286

B. Inhalation Therapy Equipment and Accessories..... 291

1. Manufacturing..... 291

2. Distribution..... 295

3. Barriers to Entry..... 295

4. Concentration and Market Shares..... 296

(a) The Respondents..... 296

(b) Other Firms..... 297

(c) Ranking of Firms..... 298

(d) Size of the Field..... 300

(e) Shares of Manufacture-Level Sales in the Field..... 302

(6) Competitive Effects of the Acquisition..... 305

A. The Extent of Competition Between BOC and Airco..... 305

B. Effects on the Industry..... 307

1. Inhalation Anesthetic Equipment..... 307

2. Inhalation Therapy Equipment..... 309

		Page
ARGUMENT		311
I	COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT "INHALATION ANESTHETIC EQUIPMENT AND ACCESSORIES" OR "INHALATION THERAPY EQUIPMENT AND ACCESSORIES" IS A RELEVANT LINE OF COMMERCE UNDER SECTION 7	311
II	COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT THIS ACQUISITION MAY SUBSTANTIALLY LESSEN COMPETITION OR TEND TO CREATE A MONOPOLY IN EITHER OF THE ALLEGED MEDICAL EQUIPMENT MARKETS	317
	A. Inhalation Anesthetic Equipment	318
	1. The Statistical Evidence Offered by Complaint Counsel Is so Incomplete and Unreliable as to Make Reliance Upon It Improper	318
	(a) The Subpoena Returns	318
	(b) The Size of the Alleged Market	320
	2. In any Event, the Nature of the Alleged Product Market Makes the "Statistics and Rest" Approach Improper	325
	3. This Acquisition Is Lawful in any Event	327
	B. Inhalation Therapy Equipment	330
PART III -	PROPOSED CONCLUSIONS OF LAW AS TO ENTIRE CASE	332
	Industrial Gases	332
	Medical Equipment	334
	General	335
PART IV -	PROPOSED ORDER	336

TABLE OF FIGURES

Figure	Description	Page
1	Oxygen Produced and Consumed in U.S. By Iron and Steel Industry (Taken from BOC RX 53-D, BOC RX 56-D)	13
2	Shipments-Oxygen (BOC RX 198)	29
3	Shipments-Nitrogen (BOC RX 194)	30
4	Oxygen Produced and Consumed By Iron and Steel Industry (BOC RX 53-D, BOC RX 56-C, BOC RX 261)	34
5	Oxygen and Nitrogen Produced for Consumption in Producing Plant (Taken from BOC RX 53-C/D)	35
6	Hydrogen Produced for Consumption in Producing Plant (Taken from BOC RX 53-C)	37
7	Oxygen Shipments (Total) (BOC RX 246-M)	47
8	Oxygen Shipments (Gas Pipeline) (BOC RX 246-K)	48
9	Oxygen Shipments (Liquid-Cylinder and Bulk) (BOC RX 246-L)	49
10	Nitrogen Shipments (Total)(BOC RX 246-I)	50
11	Nitrogen Shipments (Gas Pipeline) (BOC RX 246-G)	51
12	Nitrogen Shipments (Liquid-Cylinder and Bulk) (BOC RX 246-H)	52

Figure	Description	Page
13	Argon Shipments (Total) (BOC RX-246-B)	53
14	Hydrogen Shipments (Total) (BOC RX 246-F)	54
15	Carbon Dioxide Shipments (Total) (BOC RX 246-E)	55
16	Carbon Dioxide Shipments (Liquid and Gas) (BOC RX 246-C)	56
17	Carbon Dioxide Shipments (Solid) (BOC RX 246-D)	57
18	Nitrous Oxide Shipments (BOC RX 246-J)	58
19	Acetylene Shipments (BOC RX 246-A)	59
20	Percent Return on Stockholders' Equity (After Taxes) (BOC RX 244)	73
21	Percent Return on Total Invested Capital (BOC RX 243)	74
22	Inhalation Anesthetic Equipment and Accessories Manufactured By Companies Responding to Subpoena - 1973	267
23	Inhalation Anesthetic Equipment and Accessories Manufactured By Companies Responding to Subpoena - 1973 (Sales Figures)	279
24	Human and Dental Anesthetic and Analgesic Equipment - 1973	288
25	Human Anesthetic Equipment - 1973	289
26	Shares of Estimated Total U.S. Sales of All Anesthesia Products Made By Reporting Firms	290

Figure	Description	Page
27	Inhalation Therapy Equipment and Accessories Manufactured By Companies Responding to Subpoena - 1973	292
28	Inhalation Therapy Equipment and Accessories Manufactured By Companies Responding to Subpoena - 1973 (Sales Figures)	299
29	Shares of Estimated Total U.S. Sales of All Inhalation Therapy Products Made by Reporting Firms	303

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

In the Matter of BRITISH OXYGEN COMPANY, LIMITED, BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, BRITISH OXYGEN INVESTMENTS, LIMITED, AIRCO, INCORPORATED.	Docket No. 8955

PROPOSED FINDINGS OF FACT,
CONCLUSIONS OF LAW AND ORDER
(In Camera Material Deleted)

To: HONORABLE ERNEST G. BARNES
Administrative Law Judge

Pursuant to Section 3.46 of the Commission's Rules of Practice for adjudicative proceedings, counsel for The British Oxygen Company Limited, BOC Financial Corporation, British Oxygen Investments Limited and BOC Holdings Limited (collectively "BOC") respectfully submit proposed findings of fact, conclusions of law and order in the above-captioned proceeding.

Summary of Proceedings

In December 1973, BOC acquired 4 million shares, approximately 35%, of the common stock of Airco, Inc. ("Airco") for $80

million by means of a public tender offer.

On February 26, 1974, two months after the acquisition, the Commission issued a complaint charging that BOC's acquisition violated Section 7 of the Clayton Act. The complaint alleged that the acquisition may substantially lessen competition or tend to create a monopoly in four lines of commerce -- industrial gases, inhalation anesthetic equipment and accessories, inhalation therapy equipment and accessories, and medical pipeline systems -- and that it may eliminate BOC as a potential entrant into the United States electrical welding and gas welding and cutting markets (Cpt. ¶ 27). Shortly after commencement of this proceeding, complaint counsel abandoned their claims with respect to medical pipeline systems and welding and cutting equipment (135).

The complaint charged also that the acquisition and certain agreements between BOC and Airco related to the BOC tender offer constituted a violation of Section 5 of the Federal Trade Commission Act (Cpt. ¶ 28).

On the day this proceeding was commenced, the Commission applied to the United States District Court for the District of Delaware for a temporary restraining order and a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, voting its Airco

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stock, having BOC personnel serve on the Airco board of directors, increasing or decreasing its holdings of Airco stock, and exchanging trade secrets and similar material with Airco pending the disposition of the administrative complaint. On March 8, 1974, the Court issued a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, exchanging trade secrets with Airco -- on the condition that the Commission expedite the administrative proceeding and file a report at least every 90 days with respect to the status of the matter. The Court declined to enjoin BOC from voting its Airco shares or from having BOC personnel serve on the Airco board. FTC v. British Oxygen Co., 1974 CCH Trade Cas. ¶ 75,003 (D. Del. 1974).

On March 11 and 12, 1974, respondents filed answers denying the material allegations of the complaint. BOC subsequently filed an amended answer.

A series of prehearing conferences was held between March 12 and April 25. On March 12, BOC moved for a fixed and expedited schedule for the administrative proceeding. The motion was certified to the Commission by the Administrative Law Judge. On April 2, the Commission denied the motion insofar as it sought a fixed schedule, but ordered that the proceeding be expedited. 3 CCH Trade Reg. Rep. ¶ 20,563.

Complaint counsel's case in chief was presented in Washington, D. C. and New York City beginning on May 6 and concluding on June 5. Presentation of respondents' case began in New York City on June 5 and concluded in Washington on June 27. Complaint counsel's rebuttal case was presented on June 27 in Washington.

Commencing in April 1973, Commission staff had been conducting an investigation of the industrial gases business in the United States.[1/] On March 19, 1974, BOC moved for the issuance of a subpoena directed to the Commission calling for the production of certain documents obtained by Commission staff during the course of that investigation, for use in the preparation and defense of this matter. On April 23, 1974, the Administrative Law Judge granted the motion in part. Complaint counsel and several third parties sought interlocutory review of the order by the Commission. Following the conclusion of substantially all of complaint counsel's case in chief, the Commission granted the applications for review and upheld the Administrative Law Judge's determination. [illegible] CCH Trade Reg. Rep. ¶ 20,609. Production of the documents [illegible] began on June 10, 1974 and was completed on June 18, 1974.

1/ See affidavit of FTC staff economist Robert O. Reck, ¶ 2, FTC Exh. h in support of application for a temporary restraining order and preliminary injunction in FTC v. British Oxygen Co., 1974 CCH Trade Cas. ¶ 75,003 (D. Del. 1974).

PROPOSED FINDINGS OF FACT

The Respondents

BOC

1.[1/] Respondent The British Oxygen Company Limited is a publicly-held United Kingdom company with its principal office at Hammersmith House, London, England (Smith 1642, 1698-99). Its stock is traded on the London Stock Exchange. (CX 125-D)

2. In the fiscal year ended September 30, 1973, BOC had sales of approximately $766,095,200, earnings of roughly $29,908,800, and assets of approximately $395,642,000.[2/] (CX 292, pp. 16-17) Approximately 56% of BOC's sales and 50% of its earnings were derived from its operations in the United Kingdom and Europe. (CX 292, pp. 10, 16) The balance of its sales and earnings were derived from the operations of overseas subsidiaries and business interests, chiefly in areas of the world formerly parts of the British Empire. (CX 292, pp. 10-12, 26-27; Smith 1645) Eighty percent of BOC's overseas profits came from subsidiaries located in Australia, South Africa, India and Canada. (CX 292, p. 10)

1/ Numbered paragraphs are proposed findings of fact.

2/ Pounds sterling have been converted into dollars at the rate of $2.40 per pound throughout these proposed findings.

3. In 1973, BOC's business in the United Kindgom included the production and sale of various gases (including oxygen, nitrogen, argon, hydrogen, nitrous oxide and acetylene), cryogenic equipment, welding and cutting products, vacuum engineering, medical equipment and supplies, chemicals, metals, and consumer products and the provision of food distribution services. (CX 292, pp. 8-10; Smith 1659-61) It did not produce carbon dioxide, carbon monoxide or helium in the United Kingdom. (Smith 1770, 1773, 1798-99)

4. At the time of BOC's acquisition of an interest in Airco, BOC had two subsidiaries in the United States -- Fraser Sweatman, Inc. and Harris-Lake, Inc. -- that were engaged in aspects of the medical equipment business and which are more fully described below.

5. BOC has never produced or sold gases of any type in the United States. (Laister 2659, 2557)

6. BOC Financial Corporation is a Delaware corporation organized in 1973 for the purpose of making an offer to purchase shares of Airco. It presently owns BOC's Airco stock. All of the stock of BOC Financial is owned by BOC Holdings Limited. (Cpt. and answers ¶ 12)

7. BOC Holdings Limited is a United Kingdom company, all of the stock of which is owned by British Oxygen Investments Limited. (Cpt. and answers ¶ 13)

8. British Oxygen Investments Limited is a United Kingdom company all of the stock of which is owned by The British Oxygen Company Limited. (Cpt. and answers ¶ 14)

Airco

9. Airco is a publicly-owned New York corporation with its principal place of business in Montvale, New Jersey. (Cpt. and answers ¶ 16) Its common stock is traded on the New York and other stock exchanges. (Dillon 2585; CX 125-Z-14)

10. In 1973 Airco had net sales of $583,811,000 and net income from continuing operations of $19,111,000. (RAX 7, p. 45)

11. Airco is engaged in the manufacture of various gases (including oxygen, nitrogen, argon, hydrogen, helium, carbon dioxide, nitrous oxide and rare gases), ferroalloys and carbide, cryogenic equipment, welding and cutting equipment, carbon, graphite, electronics, metals, and medical equipment. (Cpt. and answers ¶ 17)

12. The majority of Airco's sales and earnings are derived from divisions having no connection to the products

involved in this case. (RAX 7, p. 37; Dillon 2583)

BOC's Acquisition of
An Interest in Airco

13. BOC acquired its 35% interest in Airco in the context of competing tender offers for Airco stock.

14. On December 3, 1973, Curtiss-Wright Corporation announced a tender offer to purchase 2.4 million shares of Airco at $18 a share. (Dillon 2596, 2601) On the last day of trading prior thereto, Airco common stock had closed at $12.875 per share. (CX 125-Z-14)

15. On December 10, while the Curtiss-Wright tender offer was outstanding, BOC announced a tender offer for a minimum of three million shares of Airco stock, with the right to take up to four million shares, at a price of $20. (Dillon 2599)

16. Subsequently, BOC increased the number of shares of Airco stock for which it tendered from three million to four million. (Laister 2552)

17. Pursuant to its tender offer, BOC purchased four million shares of Airco common stock in late December 1973 at a cost of $80 million. (Laister 2553)

PART I - INDUSTRIAL GASES

Proposed Findings of Fact as to Industrial Gas

(1)

Definitions

18. "Industrial gases" are defined in the complaint as "gases in compressed, liquid and solid form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof." (Cpt. ¶1)

19. The gases specifically named as "industrial gases" in the complaint are chemical elements or compounds which exist in the gaseous state at conditions of standard temperature and pressure. (Kridl 2140-41)

20. Other chemical elements or compounds which also exist in the gaseous state at standard temperature and pressure include propane, butane, propylene, fluorine, chlorine, sulphur dioxide, MAPP, Apache, acetogen and thermogen. (Kridl 2140-41; Heckel 740-41; Smith 1868-69; Giordano 1906-07, 1912-13)

21. The term "fuel gases" refers to gases which are burned in order to provide heat. (See Kridl 2137, 2143; Flamm 286; Cunningham 934)

22. "Fuel gases" include both gases that are specifically mentioned in the definition of industrial gases contained in the complaint and gases that are not. Among the fuel gases are acetylene (Flamm 286; Loveman 611-12; Smith 1997-98; Giordano 2003), propane (Flamm 286; Cunningham 934), propylene (Flamm 286, Giordano 1912-13; Perkins 780-81, 798), MAPP (Flamm 286, Cunningham 935; Giordano 2004; Loveman 497-99; Perkins 798), Oxy-MAPP (Giordano 1897), Apache (Heckel 740-41; Cunningham 935), acetogen (Heckel 740-41), and thermogen (ibid.).

23. "Rare gases" include xenon and krypton. (Giordano 1910-11; Baker 364)

24. "Medical gases" include nitrous oxide, cyclopropane and oxygen. (Kimerling 854-56; Giordano 1900; Loveman 603-10)

25. "Atmospheric gases" are gases generated commercially by the liquefaction and fractional distillation of air: oxygen, nitrogen and argon, and the rare gases -- xenon and krypton. (Baker 364) Xenon and krypton are sold in very small quantities. (Giordano 1910-11)

26. The terms industrial gases, rare gases, fuel gases and medical gases are not mutually exclusive.

27. As used in these proposed findings, the term "industrial gas company" means a firm that produces one or more industrial gases primarily for sale rather than for its own use or as a by-product.

28. The commercial significance of the gases varies considerably. In the roughest terms, the value of shipments, f.o.b. plant, or sales in 1972 were as follows:

Oxygen	$216.8 million
Nitrogen	130.3 million
Carbon dioxide	45.6 million
Argon	33.1 million
Hydrogen	33.4 million
Nitrous Oxide	4.5 million
Acetylene	94.5 million
Propane	107.4 million
Butane	4.4 million
Propylene	111.8 million
Chlorine	208.0 million 1/

(BOC RX 53-C/D; BOC RX 262-E)

1/ 1972 Census of Manufactures, Industry Series, Alkalies and Chlorine (Preliminary Report 1973). Official notice may be taken of this document.

(2)

Are "Industrial Gases" a Product Market?

A. The Uses of Gases and their Lack of Substitutability

29. Complaint counsel have conceded that the various industrial gases are "not substitutable in most cases". (278) Rather, each gas is almost invariably used for its unique chemical properties. (Flamm 276, 284, 349-50; Baker 370-72; Kridl 2142) Using one gas in place of another would often be fatal or disastrous -- the hospital patient needing oxygen cannot make do with acetylene. (Flamm 276-77, 279-85)

30. The principal use of oxygen is in the manufacture of steel. (Flamm 279-80) As Figure 1 indicates, approximately 60% of all oxygen produced in the United States is used for that purpose. (See also CX 232-Z; BOC RX 58-P/Q) Oxygen is used also in the manufacture of glass (Flamm, 281), chemicals (CX 232-W/Z; Baker 440; Kridl 2164), aluminum (Giordano 1909-10), in welding and cutting (Ibid.), and for medical purposes (Flamm 276).

31. The principal characteristics of nitrogen are its chemical inertness and its refrigeration capabilities. (Flamm 274) A major use of nitrogen is in the manufacture of ammonia (Kridl 2162-63) Nitrogen is also used extensively for blanketing in order to exclude oxygen and thereby prevent explosions. (Giordano 1910) It principal purchasers are oil companies, chemical

FIGURE 1

	1972	1971	1970	1969	1968
Oxygen produced in U.S. for all purposes (billion cubic feet - BOC RX 53-D)	353.2	319.2	283.9	276.0	248.0
Oxygen consumed by U.S. iron and steel industry (billion cubic feet - BOC RX 56-C)	233.8	207.3	219.6	214.6	181.7
Percentage of total U.S. oxygen production consumed by iron and steel industry	66.2%	64.9%	77.4%	77.8%	73.3%

companies and electronics companies. (Giordano 1910) Nitrogen is used also as a refrigerant for food freezing and in-transit preservation of food. (Flamm 281-83)

32. Argon is an inert chemical element; its principal use is in stainless steel welding. (Giordano 1910; Kridl 2157)

33. Xenon is an inert chemical element used in electronic applications and sold in very small quantities. (Giordano 1910-11)

34. Krypton is an inert chemical element sold in very small quantities. (Ibid.)

35. Helium is an inert chemical element. It is used in gas shielding processes to exclude the atmosphere, in leak detection, in research, and in balloons. (Giordano 1911)

36. Hydrogen is a combustible gas used in a variety of applications including annealing of steel, hydrogenation of foods, as a rocket propellant and in the manufacture of ammonia (Giordano 1911; Kridl 2133).

37. Carbon dioxide is used primarily in the beverage industry for the carbonation of soft drinks. It is used also as a refrigerant in the food industry and as a shielding gas in certain welding applications (Giordano 1911-12). Carbon dioxide and nitrogen are not normally interchangeable in food freezing and refrigeration applications (Flamm 281-83).

38. Acetylene is of urique utility in welding and cutting. (Kridl 2168)

39. Nitrous oxide is used by the medical and dental professions as an analgesic or anesthetic. (Giordano 1900)

40. Cyclopropane is a human anesthetic. (Giordano 1900)

41. MAPP is used primarily for cutting metals. The equipment used for that purpose differs from acetylene cutting equipment. (Giordano 1912)

42. Propylene is a fuel gas similar to MAPP. The cutting equipment used with propylene is the same or similar to equipment used with MAPP. (Giordano 1913)

43. Propane has two principal uses: heating, including cutting, and the synthesis of propylene. (Giordano 1912-13; Kridl 2137)

44. The principal use of butane is in the chemical industry. (Kridl 2138)

45. Apache, acetogen and thermogen are fuel gases used for their heating properties. (Heckel 740-41)

B. Methods of Production

46. The gases involved in this proceeding are produced by a wide variety of largely unrelated techniques. Complaint counsel have stipulated "they are not made by the same process." (268)

47. The atmospheric gases -- oxygen, nitrogen, argon, krypton and xenon -- are produced commercially by the cryogenic liquefaction and fractional distillation of air. Air consists of about 78% nitrogen, 21% oxygen, and 1% argon and traces of other elements, including krypton and xenon. (CX 335-Z) It is cooled to approximately -300°F, at which point it is a liquid, and the elements are separated by virtue of their different boiling points. (Kridl 2132-33, 2139)

48. While other processes exist for the production of oxygen and nitrogen, they are not commercially significant. (Flamm 265-67, 274)

49. Helium occurs naturally in certain types of natural gas found in parts of the United States, Canada, Poland and Algeria. (Kridl 2134-35; Flamm 315-16) It is extracted by low temperature distillation. (Kridl 2134-35)

50. The most significant commercial sources of hydrogen are steam reformation of natural gas and as a by-product of

petrochemical and petroleum refining. (Kridl 2133, 2139-40; Giordano 1923-24; Flamm 275). It is produced also as a by-product of electrolytic generation of chlorine and fluorine (ibid.).

51. Acetylene is normally produced by chemical reaction between calcium carbide and water (Flamm 270; Perkins 811).

52. The principal source of propane is the cyrogenic liquefaction and fractional distillation of natural gas; it is obtained also as a by-product of petroleum cracking. (Kridl 2135-36, 2139)

53. Butane is obtained by the same methods as propane. (Kridl 2136)

54. The liquefaction and fractional distillation processes used for deriving propane and butane, on the one hand, and the atmospheric gases, on the other, are exactly analogous. The only difference is that lower temperatures are used in air separation. Essentially the same equipment is used except that air separation requires more insulation. (Kridl 2136-37, 2139)

55. Fluorine is prepared by electrolysis of fluorine-containing salts. (Kridl 2139)

56. Chlorine is obtained by electrolysis of brine. (Ibid.)

57. Carbon dioxide is produced principally as a by-product of the manufacture of ammonia. (Kridl 2141; Giordano 1925; Flamm 267-69)

58. MAPP is a by-product of petrochemical processes. (Giordano 1897)

59. There is little or no cross-elasticity of production facilities used for the preparation of industrial gases.

60. In only two instances are the same facilities capable of use in producing more than one industrial gas. They are the air separation plants used in obtaining atmospheric gases and the cryogenic liquefaction and fractional distillation equipment used in deriving propane and butane from natural gas.

61. Air separation plants necessarily produce oxygen and nitrogen as co-products. (Kridl 2159) These plants can be designed so as to derive argon, krypton and xenon in addition. (Dempster 515; Kridl 2165)

C. Distinct Prices

62. The gases described in the complaint as industrial gases are sold at distinct prices. (BOC RX 190, 191, 193, 195, 196, 197 and 199)

D. Sensitivity to Price Changes

63. There is no interrelationship among the prices of the various industrial gases except to the extent that the atmospheric gases, because they are co-produced simultaneously, have interrelated production costs. Otherwise, the price of each gas is determined by its supply and demand picture, independent of the supply and demand for other gases. (Giordano 1942-43) Moreover, the cost interrelationships among the atmospheric gases do not necessarily cause the price charged for one to influence the demand for or price of another. Rather, the only relationship is the tendency for the prices of oxygen and nitrogen to be similar because they cost about the same to produce and distribute. (Giordano 1942)

E. Industry Recognition

64. There is common industry recognition that the atmospheric gases are industrial gases. But beyond that consensus the hearing record indicates no common view as to whether other gases are "industrial gases" or part of an "industrial gas industry".

65. The industry witnesses testified as follows:

66. Mr. Flamm of Union Carbide, in response to the question whether he considered fuel gases to be industrial gases, testified (341-42):

"We term virtually anything we sell in the gas area as industrial gas. Therefore, any product that those products compete with, I am not talking about all of the marketplaces that propane competes, but to the extent that it competes as a fuel gas we consider all of these things as part of that environment out there. We are competing against it; therefore, it must be industrial gas. If it isn't an industrial gas, acetylene must not be.

"Q Then I take it you are telling me that an industrial gas is gas which is sold to industry for use in the industry?

"A Obviously, I would be in trouble because Judge Barnes might ask what about chlorine. So there is some limitation on the parameters we describe here. For our very parochial interest we describe industrial gases as those gases that we competed in my department.

"Q But another company may have a different set of gases called industrial gases which they might use in their own in-house nomenclature?

"A That is correct."

He regarded propane and propylene as industrial gases. (Flamm 218)

67. Mr. Baker of Air Products testified that industrial gases are the atmospheric gases plus hydrogen, helium, acetylene, carbon dioxide and carbon monoxide. (Baker, 364, 427) He testified also that while acetylene is "perhaps" an industrial gas, other fuel gases -- propane in particular -- are not and he does not believe anyone thinks that they are. (Baker 426)

68. Mr. Dempster of Liquid Air testified that the industrial gas business is basically the atmospheric gases plus anything else he can sell at a profit. (Dempster 555) He

"certainly" regards the fuel gases as industrial gases, a statement consistent with the classification of fuel gases as industrial gases in Liquid Air's prospectus. (Dempster 554-55; CX 335-Y/Z)

69. Mr. Loveman of Burdett of Cleveland testified: "Industrial gases would be those gases applicable to some type of non-medical application." (Loveman 578)

70. Dr. Muller defined industrial gases as "atmospheric gases plus those gases which we get from the earth ... or from combustion processes," including helium, hydrogen and carbon dioxide. (Muller 648) Since propane and butane, like helium, are extracted from natural gas, Dr. Muller apparently regards them as industrial gases.

71. Mr. Perkins of Burdett of Norristown, like Mr. Flamm, said that he defines industrial gases as the gases that his company makes and sells. (Perkins 780) When asked whether carbon dioxide was an industrial gas, Mr. Perkins said: "Partially, sort of ... I think it is probably industrial gas, but doesn't fall under the same connotation as the others." (Perkins 781) And while Mr. Perkins testified that acetylene and propylene are industrial gases, he said that propane is not -- although it is a fuel gas. (Perkins 798)

72. Mr. Cunningham of Chemetron testified that industrial gases are "those kinds of gases basically used by industry". (Cunningham 918)

73. Mr. Smith of BOC testified that he regards oxygen, nitrogen, argon, krypton, xenon, fuel gases, carbon dioxide, carbon monoxide, helium, hydrogen and sulfur dioxide as industrial gases. (Smith 1797-99)

74. Finally, Dr. Kridl testified that while chlorine and fluorine are not normally considered industrial gases, this seemingly results only from historical accident. since they are gases under ordinary conditions and there is nothing "in the way these substances are either generated or used which would explain their not being regarded generally as industrial gases." (Kridl 2139-41)

75. To summarize, all of the industry witnesses agreed that the atmospheric gases and hydrogen are "industrial gases". However, there were some witnesses who regarded each of the remaining gases as "industrial gases" and some who did not. There was particular disagreement as to whether carbon dioxide and fuel gases are industrial gases.

F. Full Line or Partial Line Production and Marketing

76. Substantially all of the major gas companies make and sell oxygen, nitrogen and argon. Beyond that core, the range

of gases made and sold varies considerably.

77. Union Carbide, the largest industrial gas company in the United States (Flamm 220-21; CX 325), makes oxygen, nitrogen, argon, hydrogen and acetylene. It buys and resells helium. It does not produce nitrous oxide and has not produced xenon and krypton recently. (Flamm 213-16) Union Carbide produces some carbon dioxide as a by-product of another process but sells its production to Airco. (Giordano 1923) It does not regard itself as producing or marketing a "full line" of gases. (Flamm 218)

78. Air Products claims to produce and market a "full line" except for helium, which it buys from others. (Baker 372-74) But it does not manufacture nitrous oxide, does not sell propane and, like Union Carbide, is not a significant factor in carbon dioxide. (Baker 426, 2782; Giordano 1923)

79. Airco produces and sells the atmospheric gases, hydrogen, carbon dioxide, acetylene, nitrous oxide, and propylene. It purchases and resells helium and MAPP. It neither makes nor sells propane or carbon monoxide. (Giordano 1979-85; RAX 7-K)

80. Chemetron produces oxygen, nitrogen, argon, hydrogen, acetylene and carbon dioxide. It sells but does not produce cyclopropane, nitrous oxide and some compounded fuel gases. (Cunningham 917)

81. Liquid Air manufactures and sells oxygen, nitrogen and argon. It does not make or sell propane, fuel gases, krypton or xenon. (Dempster 515)

82. Burdett of Cleveland produces only oxygen, nitrogen, argon, acetylene and hydrogen. It purchases and resells helium and carbon dioxide. (Loveman 577-78)

83. Burdett of Norristown produces only acetylene; its joint venture, Narox, produces oxygen and nitrogen. Burdett sells hydrogen, helium, nitrous oxide and certain fuel gases, but it does not produce or sell carbon dioxide, carbon monoxide, or propylene. (Perkins 780-81)

84. Alabama Oxygen produces only oxygen, nitrogen, acetylene and hydrogen. It markets helium, carbon dioxide, MAPP and nitrous oxide. It does not produce or market carbon monoxide and appears not to produce or market any fuel gas other than acetylene. (Kimerling 854-56)

85. Northern Gases and Supply Co. produces oxygen, nitrogen, and acetylene and buys for resale oxygen, nitrogen, argon, carbon dioxide, helium, hydrogen, propane and nitrous oxide. It does not produce or market rare gases, fuel gases other than propane and acetylene, or cyclopropane or carbon monoxide. (Heckel 730)

86. There appear to be commercial advanges to marketing two groups of gases together.

87. First, certain fuel gases are used with oxygen in cutting and welding. (Giordano 2004) Hence, in selling to the welding trade it is helpful to market oxygen and those fuel gases with welding and cutting applications: MAPP, acetylene, Apache, propane and propylene. (Giordano 1912-13, 2004)

88. The second grouping -- the major atmospheric gases, oxygen, nitrogen and argon -- tend to be marketed together because they are produced together. Thus, the sale of all of the atmospheric gases produced is economically desirable even if the decision to construct and operate the plant is premised solely on a market for one gas. (Kridl 2159-60)

89. Other gases appear to have no such relationship to one another and there is no commercial advantage or necessity to market them in conjunction with one another. Mr. Giordano included hydrogen and helium in this category. (Giordano 2004) A number of other gases, including carbon dioxide and carbon monoxide, are similarly independent of one another. (See Baker 427; Giordano 1922, 2023)

G. Marketing Staffs

90. The different gases are marketed by different personnel to a considerable extent, even when the same company sells a broad range of gases.

91. Liquid Carbonic and Chemetron, the two largest carbon dioxide producers (Baker 2782), both have separate divisions of their companies devoted exclusively to the production and sale of carbon dioxide, with other gases being handled by other divisions. (Giordano 1923-24; Cunningham 929-30) Airco has a special marketing group that supports the sales of carbon dioxide. (Giordano 1921-22)

92. Specialization by gases is not confined to carbon dioxide. Airco has separate sales staffs for the sale of rare gases, for the sale of gases connected with welding and cutting and for the sale of medical gases. (Giordano 1913-14). It has specialists supporting the sales of the various gases because the applications of the gases are different and the sales personnel must understand the customers' need. (Giordano 1921-22)

93. Airco employs different staffs to sell to tonnage customers, bulk customers and small users (these terms are defined in later findings). It does so because applications vary among these different customers, and extensive technical support is necessary. (Giordano 1920-22)

(3)

Structure and Economic Performance of the Industrial Gas Industry

A. Distribution Structure of The Industrial Gas Industry

94. The industrial gas industry has two major segments: tonnage and merchant. Tonnage refers to the supply to customers whose demand at a particular location is sufficient to justify the construction of a plant at or near the customer's facility which is devoted entirely or primarily to providing that customer with gaseous product through a pipeline. (Giordano 1914-15) A tonnage or on-site plant is a plant devoted to such use. Typical tonnage users include Ford Motor Company, U.S. Steel, Bethlehem Steel, Armco Steel, Republic Steel, Allied Chemical, McLouth Steel and National Steel. (Giordano 1917; Baker 442-43; Perkins 802-03; Flamm 290-96)

95. Merchant refers to other sales of gases, which take place in much smaller quantities and in which the gas is transported to the customer by truck or rail. (Giordano 1985-86)

96. The merchant side of the business is also composed of two segments: bulk liquid and cylinders. Bulk liquid refers to gases shipped in relatively large quantities in liquid form. (Giordano 1914-15; Flamm 318-19) In cylinder distribution, the

gas is distributed in gaseous form under high pressures in small metal cylinders. (Giordano 1926)

97. The only gases which are produced and sold in the United States on a tonnage basis are oxygen, nitrogen and hydrogen. (Giordano 1918) Gases distributed as bulk liquid include oxygen, nitrogen, argon, hydrogen, carbon dioxide and helium. (Giordano 1927-28) All of the gases are sold in cylinders.

98. Figures 2 and 3 (BOC RX 198, 194) show the relative importance of the different modes of distribution for oxygen and nitrogen based on shipments of those gases over the past ten years.

99. Figure 2 demonstrates that pipeline distribution of oxygen gas -- tonnage supply -- accounted for more than half of the total value of shipments and over 80% of the total quantity of shipments of oxygen in 1972. The only other significant mode was bulk liquid, which accounted for almost 38% of the value of shipments and 14.5% of the total quantity of oxygen shipped. Distribution of gas in cylinder and bulk form and of liquid oxygen in pipeline form are not significant.

100. Figure 3 shows a somewhat similar situation for nitrogen. Over 60% of the total quantity and almost 25% of the total value of nitrogen shipments were pipline gas-tonnage. About one-third of the total quantity and 70% of the total value of shipments were liquid bulk. Cylinder and bulk gas and pipeline

FIGURE 2

(BOC RX 198)

SHIPMENTS - OXYGEN

Year	Total		Gas				Liquid			
			Method of Distribution				Method of Distribution			
			Cylinder and Bulk		Pipeline		Cylinder and Bulk		Pipeline	
	Value*	Quantity+	Percent of Total Value	Quantity	Percent of Total Value	Quantity	Percent of Total Value	Quantity	Percent of Total Value	Quantity
972	216.8	301.8	1.8	0.2	54.9	81.8	37.5	14.5	5.8	3.5
971	226.2	268.9	1.9	0.2	47.5	81.1	42.2	18.8	8.4	0.7
970	237.7	273.5	4.4	1.0	46.6	80.9	49.0	18.1	--	--
969	229.4	264.9	5.0	1.2	43.4	80.5	51.6	18.3	--	--
968	224.9	238.4	5.1	1.7	40.4	79.3	54.5	19.0	--	--
967	208.8	220.8	7.8	1.8	44.2	79.2	48.0	19.0	--	--
966	173.8	202.4	11.5	2.1	49.9	76.6	38.6	21.3	--	--
965	172.5	172.4	13.5	2.3	43.0	74.4	43.5	23.3	--	--
964	157.3	148.2	16.0	2.7	47.2	73.6	36.8	23.7	--	--
963	136.4	119.0	21.3	4.1	44.1	71.5	34.6	24.5	--	--

Millions of dollars (current dollars).

Billions of cubic feet.

ource: Bureau of Census, Current Industrial Reports, Industrial Gases, 1963-72.

FIGURE 3

(BOC RX 194)

SHIPMENTS - NITROGEN

Year	Value*	Quantity+	Gas				Liquid			
			Method of Distribution				Method of Distribution			
			Cylinder and Bulk Percent of Total		Pipeline Percent of Total		Cylinder and Bulk Percent of Total		Pipeline Percent of Total	
			Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity
1972	130.6	176.8	2.4	0.4	23.4	63.4	70.6	33.3	3.6	2.9
1971	128.1	153.8	1.9	0.4	22.1	62.2	72.7	34.6	3.3	2.8
1970	123.0	134.9	3.7	0.5	20.7	60.3	75.6	39.2	—	—
1969	118.6	118.3	3.3	0.5	19.5	59.3	77.2	40.2	—	—
1968	114.8	105.4	4.1	0.7	16.6	57.1	79.3	42.1	—	—
1967	99.6	91.9	5.3	0.8	20.0	56.9	74.8	42.3	—	—
1966	80.6	78.7	8.2	1.2	27.4	58.6	64.4	40.1	—	—
1965	69.2	55.3	10.3	1.5	25.4	57.0	64.2	41.5	—	—
1964	48.1	51.3	14.3	1.9	17.2	56.3	68.5	41.7	—	—
1963	40.0	44.0	18.5	2.5	15.8	60.2	65.7	37.3	—	—

*Millions of dollars (current dollars).

+Billions of cubic feet.

Source: Bureau of Census, Current Industrial Reports, Industrial Gases, 1963-72.

A 372

liquid were not significant.

101. Indeed, the foregoing analysis understates the significance of tonnage supply for both oxygen and nitrogen because it is limited to shipments, thus excluding oxygen and nitrogen produced for consumption in the producing plant -- the production of backward-integrated users. Figure 4, to be discussed, suggests the significance of these self-suppliers.

B. Production and Marketing of Industrial Gases

102. There are two general categories of producers of industrial gases in the United States -- (1) the industrial gas companies and (2) those who make industrial gases either for their own use or as a by-product of other processes. The latter group may or may not sell industrial gases.

1. Industrial Gas Companies

103. The industrial gas companies were classified at the hearing as either "majors" or "independents". The majors are, in order of value of shipments reported to the Census Bureau under SIC code 2813, the Linde Division of Union Carbide Corporation, Air Products & Chemicals, Inc., Airco, Chemetron Corporation, Liquid Air, Inc., Liquid Carbonic Corporation -- a division of Houston Natural Gas Corporation, and Big Three Industries, Inc. (Flamm 220-21; CX 325; Kimerling 864) The independents include Burdett Oxygen Company of Cleveland ("Burdett of Cleveland"),

Alabama Oxygen Company, Burdett Oxygen Company ("Burdett of Norristown"), Northern Gases & Supply Company, Selox, Southern Cryogenics, Nunn Gases, National Welders Supply Co., Pacific Oxygen and Whitmore Oxygen. (Kimerling 864-69-70)

104. The majors all reported to the Census Bureau shipments of industrial gases under SIC code 2813 valued at [D 1][1] or more, f.o.b. plant, in 1972. (CX 325; Dempster 516; Flamm 221) With the exception of Burdett of Cleveland, no independent reported shipments valued at more than $5 million. (See Smith 1737; Dempster 553-54; Kridl 2244) Burdett's shipments were between $12 and $14 million. (Loveman 599-600; CX 325)

105. Another difference between the majors and the independents is that the majors have the resources to supply gases in more than one marketing area while the independents are all quite limited in their geographic scope. (Kimerling 860-63)

2. Other Industrial Gas Producers

(a) Backward-Integrated Tonnage Users

106. Numerous tonnage users of atmospheric gases own and operate tonnage plants to supply their own requirements. Ford Motor Company has its own steel mill and supplies the necessary oxygen from its own air separation plant. (Baker 2742-43, 442; Flamm 291; Kridel 2149-50) United States Steel has four large air

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[1] Reference is to item D 1 of the deleted in camera material. The deleted material is contained in the confidential supplement filed herewith.

separation plants supplying certain steel operations. (Flamm 288-90; Baker 442; Kridl 2149-50) Other steel manufacturers -- including McLouth Steel, Wheeling-Pittsburgh Steel, National Steel and the American Steel & Wire Division of United States Steel -- also operate air separation plants. (Flamm 291; Baker 442) Moreover, petroleum refiners produce their own hydrogen. (BOC RX 53-D, n. 5)

107. This backward integration by large users is quantitatively significant. Figure 4 demonstrates that steel and iron companies have produced substantial proportions of both the total oxygen consumed by that industry and of the total oxygen produced in the United States over the past several years.

108. A further indication of the significant of backward integration can be gleaned from Bureau of Census data. Figure 5 demonstrates that oxygen and nitrogen produced for consumption in the producing plant and not shipped -- which excludes by definition tonnage gas supplied by the industrial gas companies[1/] -- has been a significant proportion of total oxygen and nitrogen production in the United States in recent years. Moreover, the figures for nitrogen understate the extent of back integration, since they exclude nitrogen used in ammonia manufacture, a major use in which there are substantial incentives to backward integration. (Kridl 2162-63)

1/ See CX 299-C

FIGURE 4

	1973	1972	1971	1970	1969	1968
Oxygen produced in U.S. for all purposes (billion cubic feet - BOC RX 53-D)	N.A.	353.2	319.2	283.9	276.0	248.0
Oxygen consumed by U.S. iron and steel industry (billion cubic feet - BOC RX 56-C)	265.2	233.8	207.3	219.6	214.6	181.7
Oxygen produced by U.S. iron and steel industry (billion cubic fee - BOC RX 56-C)	34.1	25.6	26.9	26.6	25.2	15.2
Proportion of total U.S. oxygen production produced by iron and steel industry	N.A.	7.2%	8.4%	9.4%	9.1%	6.1%
Proportion of total iron and steel industry oxygen consumption produced by iron and steel industry	12.8%	12.3%	14.9%	13.4%	13.3%	9.1%

Note: 1973 data derived from BOC RX 261.

FIGURE 5

	1972	1971
Oxygen		
Total produced in U.S. for all purposes (billion cubic feet)	353.2	319.2
Produced for consumption in producing plant (billion cubic feet)	51.5	50.3
Proportion produced for consumption in producing plant	14.6%	15.8%
Nitrogen		
Total produced in U.S. for all purposes (billion cubic feet)*	193.5	168.0
Produced for consumption in producing plant (billion cubic feet)*	16.5	15.7
Proportion produced for consumption in producing plant	8.5%	9.3%

* Exclusive of amounts produced and consumed in the manufacture of synthetic ammonia and ammonia derivatives. (CX 299-C)

Source: BOC RX 53-C/D. Data not available prior to 1971.

109. According to the Bureau of the Census, the "[v]alue of industry shipments [of industrial gases since 1967] has shown slow growth, because an increasing quantity of gas is being produced captively." (BOC RX 208-B)

110. The backward-integrated tonnage users on occasion have excess gases available. (Baker 2742-44) These surpluses are normally sold to the gas industry on a spot basis but sometimes are sold to specific distributors under regular contractual arrangements. (Ibid.) Specifically, Chemetron, one of the larger gas companies, has purchased oxygen from Ford and McLouth Steel, and various chemical companies have wholesaled product into the industrial gas business. (Cunningham 944-45; Flamm 354-55)

111. Another industrial gas produced on a tonnage basis is hydrogen. (Giordano 1918) Backward integration by users of hydrogen is even more common than with oxygen and nitrogen. As Figure 6 demonstrates, Census Bureau data indicate that more than 68% of the hydrogen produced in the United States in recent years was produced for consumption in the producing plant, i.e., not by industrial gas companies. Moreover, those data exclude hydrogen produced and consumed in the manufacture of synthetic ammonia and in petroleum refining (BOC RX 53-C/D n. 5), which are two major uses of hydrogen (Kridl 2133, 2162-65).

FIGURE 6

	1972	1971
Hydrogen produced in U.S. for all purposes (billion cubic feet)*	58.9	55.7
Produced for consumption in producing plant (billion cubic feet)*	40.6	38.0
Percent produced for consumption in producing plant	68.9%	68.2%

* Amounts are exclusive of amounts vented, used as fuel, consumed in the manufacture of synthetic ammonia and methanol, and produced in petroleum refineries for captive use

Source: BOC RX 53-C. Data not available prior to 1971.

112. Indeed, one knowledgeable industry witness called by complaint counsel, after testifying that El Paso Natural Gas produces hydrogen, went on to say: "There is probably a list of 50 companies in the chemical industry that produce these as raw materials for their own processes, as building blocks. It could be hydrogen, it could be CO, it could be oxygen." (Flamm 294)

(b) Industrial Gases Produced as By-Products of Chemical Processes

113. Industrial gases are quite commonly produced as by-products in various processes. (Flamm 294-95)

114. Carbon dioxide is a by-product of the manufacture of ammonia and other processes. (Kridl 2174; Cunningham 946; Giordano 1925) Chemical and petroleum companies, including manufacturers of ammonia, are the usual sources of carbon dioxide for industrial gas companies. (Dempster 562-63) In fact, Chemetron, the second largest seller of carbon dioxide in the United States, buys by-product carbon dioxide. Airco buys almost all of its carbon dioxide from such chemical and petroleum companies as Union Oil, Allied Chemical, and Monsanto. (Cunningham 946; Giordano 1925)

115. Much the same situation exists for hydrogen. Petroleum and chemical companies actively produce hydrogen as a

by-product. (Baker 441; Dempster 562-63) For example, PPG Industries sells hydrogen to Chemetron (Cunningham 944-45); Sun Olin Chemical sells to Airco (Giordano 1923-24); and Champion Paper and Hooker Chemical both sell to Chemetron (Cunningham 944-45).

116 Helium is extracted from natural gas and then refined. Petroleum companies, including Cities Service and Phillips Petroleum, own sources of helium-rich natural gas, extract the helium, refine it, and sell it. (Baker 445; Flamm 272-73 Giordano 1980-81; CX 232-Z-8/Z-9)

3. Distributors

117. The industrial gas companies regularly sell to ultimate consumers, but they also employ independent distributors in selling in the merchant market. Typically, distributors are small family businesses engaged in supplying the welding trade with gases and equipment. (Giordano 1945-46; Smith 1733-34; 1741; Flamm 218-19, 314) The distributors normally buy their gases exclusively from one company under term contracts. (Flamm 344-45; Baker 2757)

118. The extent to which gas companies employ distributors varies widely. The approximate proportions of the total sales of gases made to distributors by some of the major companies are.

Chemetron	50%	(Cunningham 923)
Airco	33%	(Giordano 2004)
Liquid Air	21%	(CX 335-Z)
Air Products	10%	(Baker 427-28)

119. The product lines carried by the distributors vary considerably. In response to the question whether distributors market a "full line" of gases, Mr. Flamm testified (218-19):

> "That varies with the distributor. Some of our distributors could very well market products that do not emanate with Linde. In other words, a distributor that markets Linde products could very well market such things as MAPP or welding equipment from a different manufacturer than ours. Hence they could conceivably in certain areas be broader than are we.
>
> "Q Do distributors market all of the industrial gases distributed by Linde?
>
> "A No, not necessarily, it will vary with the distributor. In other words, a distributor is not a monolithic thing. Some distributors will have a much broader line than others. Some may be only insignificantly involved in gases. It varies.
>
> "JUDGE BARNES: These are independent third party distributors?
>
> "WITNESS: That is correct. Essentially all of them are . . . . "

C. Competition and Economic Performance in the Industrial Gas Industry

1. Price Competition

120. There was unanimous agreement at the hearing among all of the industry and expert witnesses that price competition in the industry is extremely vigorous. A sampling of the testimony of complaint counsel's witnesses follows:

Mr. Dempster (Liquid Air)

"Q Is there vigorous price competition between industrial gas companies in the United States in the sale of industrial gases?

[Colloquy omitted]

"THE WITNESS: I would say the competition is very severe."
(Dempster 556)

Similarly, Liquid Air's prospectus states: "The industrial gas business is highly competitive, with the principal competitive factors being price and efficient service." (CX 335-Z-3)

Mr. Flamm (Union Carbide)

"Q Is it the normal industry practice that one company's price parallels another company's price and that you really compete with each other in service?

"A Oh, it varies. There is price competition.

* * *

"Q A vigorous level of price competition, would you say?

"A Yes; I would say when we go out there, when companies such as Linde and AIRCO and Air Products, as far as the customer is concerned, they argue their service is equal, [but] I would say there is a fair amount of vigorous price competition."

Mr. Baker (Air Products)

"Q On the basis of your experience in the industry down through the years, would you say that there is vigorous competition in the industrial gas field in the United States today?

"A Yes.

* * *

"Q My question was whether the competition that you describe in the industrial gases field is not only price competition, but also extends to competition into research and development and new processes and products?

"A Yes, I think that is true."
(Baker 436-37)

(See also Loveman 608-09; Heckel 745-46; Kimerling 882; Kridl 2159-80)

121. This testimony is fully consistent with the conditions observed by Messrs. Perham and Greenfield in their 1970 study of the United States gases industry (see Proposed Finding 228, infra). Their reports and field notes are filled with evidence of severe price competition in the industry. In fact, their report begins by stating: "Industrial gases have become

a commodity in the USA and as a result are sold essentially on price. The result is a depressed industry with supply schemes being taken just about the cost of capital. Facility charges, transport costs, demurrage and even basic price schedules are being sacrificed in an attempt to gain market share." (BOC RX 62-B)

122. Their reports on meetings with participants in the industry fully support the conclusion. For example, they wrote:

> "Edwards [of Liquid Carbonic] believes present state of the industry due to a price war caused by Air Products since 1950, but compounded by Airco. Union Carbide attempted to be price leaders in 1966/7 but were badly undercut and lost substantial market share which caused UCC to retaliate to hold their position. Burdette are credited with being major price cutters in the Ohio area, even outdoing AP." (CX 232-Z-24)

They reported that Mr. Flamm of Union Carbide reported to them that:

> "Life is difficult, with fierce competition by Air Products and Big Three who now always finance tonnage schemes off the balance sheet. They can borrow at 9% on security of contract and cost out at a price to go 2% above the cost of capital." (CX 232-N)

Arthur D. Little, Inc., reported:

> "In 1966 Union Carbide put up prices and immediately lost market share. The latest increase by Union Carbide was last year [1969] when a nominal increase of 10% was made but overall their gain averaged out at 5% increase,

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> coupled with some attrition of contracts resulting in Union Carbide being forced to restructure some of their schedules." (CX 232-S)

And Perham and Greenfield reported Airco executives as saying:

> "Prices [on tonnage supply schemes] very depressed by fierce bidding. Only AP and Big Three doing well, but because of their financial strategy of low equity and very high gearing so they can take contracts at little more than cost of capital." (CX 232-J)

123. The price history of the industry demonstrates the accuracy of the testimony of these industry witnesses and of the Perham-Greenfield report. The prices of almost all of the major industrial gases have dropped dramatically in recent years, as demonstrated by the charts which are Figures 7 through 19.[1/] (BOC RX 246) For example, the unit value of shipments of

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[1/] There are no price data as such in this record. Conclusions regarding prices have been drawn from data compiled by the Census on the total value and quantity of shipments of the various gases, f.o.b. plant, with the unit value (i.e., the ratio of total value of shipments to total quantity of shipments) used as an approximation of price. This is a good approximation of price in the tonnage segment of the business because pipeline distribution is cheap and distribution expense therefore is not an important cost element. In the merchant segment, pricing information is both difficult to obtain and of questionable accuracy. It is the usual practice in the industry to price on a delivered basis. (See Flamm 220-22; Giordano 1965) In the merchant market, distribution is a significant cost element which necessarily varies for each customer. Moreover, facilities charges and demurrage on shipping, receiving and storage equipment also play an important role in merchant pricing. Hence, delivered prices are almost meaningless and unit value is the best available surrogate here as well. (Giordano 1965-47; CX 232-F) The Commission has explicitly approved use of estimated data such as these where they are of the sort that might be used in making business decisions in the ordinary course of business. Pillsbury Co., 57 F.T.C. 1274, 1394 (1960). On appeal on other grounds, Pillsbury Co. v. FTC, 354 F.2d 952 (5th Cir. 1966).

oxygen has dropped from $1,100 per million cubic feet in 1963 to $720 per million cubic feet in 1972, with the unit value of pipeline oxygen gas -- the most important method of distribution from a commercial standpoint -- dropping steadily from $700 per million cubic feet in 1963 to $480 per million cubic feet in 1972. (BOC RX 199) Similarly, the unit value of nitrogen dropped almost 30% from 1963 through 1972. (BOC RX 196) The unit value of carbon dioxide has dropped nearly 50% in that period (BOC RX 193), and the unit value of argon has dropped by over 50%. (BOC RX 191) In fact, only for hydrogen has the unit value risen since 1963, and even that has dropped almost 30% since 1966. (BOC RX 195)

124. These price declines took place, it should be noted, during a decade in which industrial prices in general were rising rapidly. The Bureau of Labor Statistics wholesale price index for all industrial commodities rose from 94.7 in 1963 to 117.9 in 1972 -- an increase of almost 25%. Table No. 570, Statistical Abstract of the United States 1973.

125. While several industry witnesses testified to modest recent price increases following the expiration of federal price controls (Baker 2723; Flamm 348-49; Cunningham 938), these increases have not even been sufficient to keep pace with the rate of inflation (Cunningham 938; Flamm 327-29, 353).

126. These price declines and price weaknesses are explicable on the basis of structural features of the industrial gas industry.

127. A key factor has been the industry's heavy reliance on the steel industry as its major customer. (E.g., RAX 7-Z-13; Flamm 279) The 1960's saw the advent of the basic oxygen process in steel making, which caused a great increase in the demand for oxygen and therefore necessitated the construction of much larger plants than had theretofore been built. (Kridl 2159; Giordano 1940-41) These large plants enjoy substantial economies of scale, resulting in major decreases in the cost of producing oxygen on a tonnage basis -- decreases which were passed on to the steel companies. (Kridl 2159)

128. The rash of construction of huge tonnage plants for the steel industry also had dramatic repercussions for the prices of nitrogen and argon and for the merchant market in all three major atmospheric gases. First, since nitrogen and argon are necessarily co-produced along with the huge quantities of oxygen required by the steel industry, the basic oxygen process brought with it vast quantities of nitrogen and argon for which there was no pre-existing market. The necessary effect was to depress nitrogen and argon prices. (Kridl 2159-65) Second, the great economies of scale realized in large tonnage plants built to

FIGURE 7

(BOC RX246 M)

OXYGEN SHIPMENTS

TOTAL

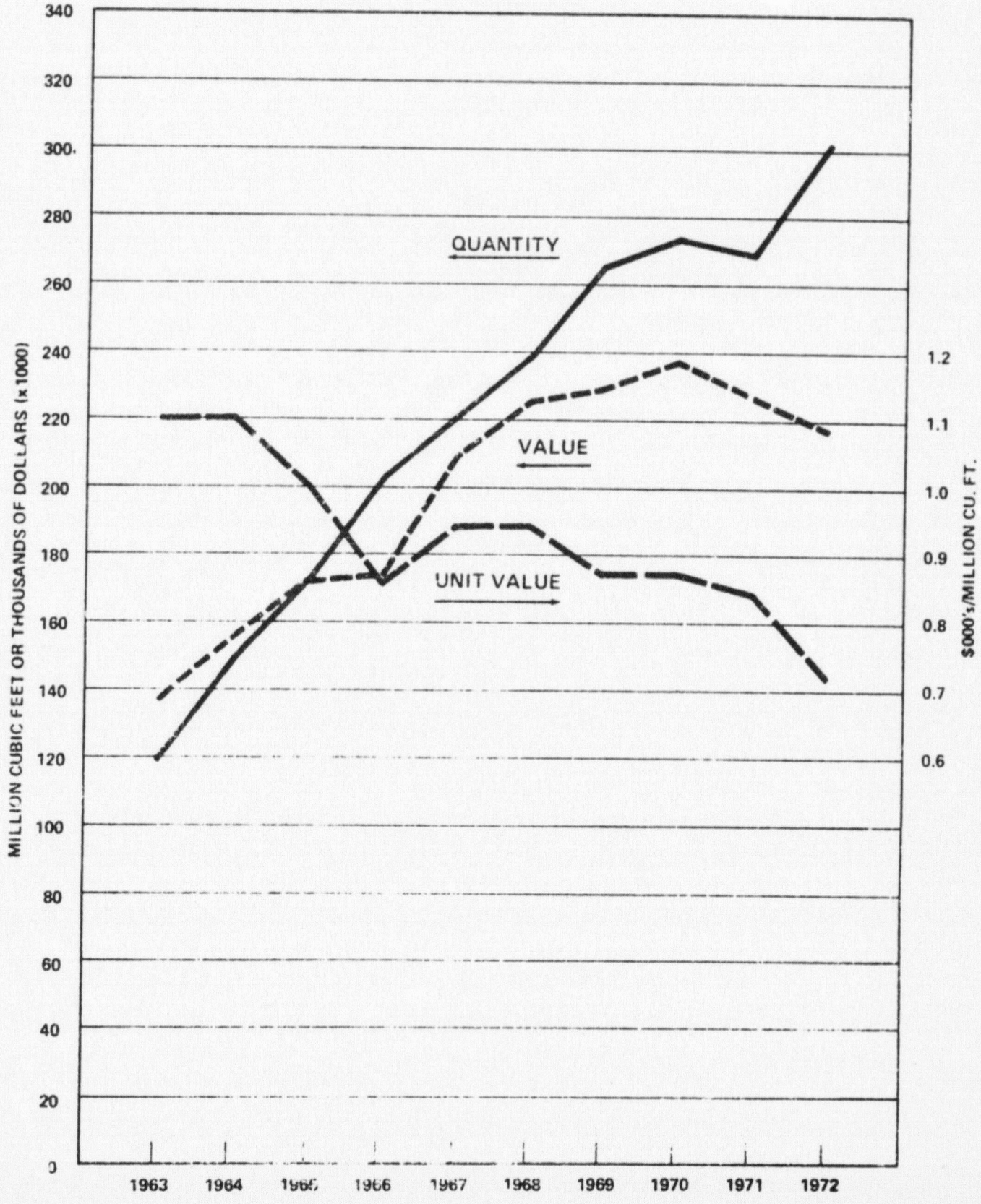
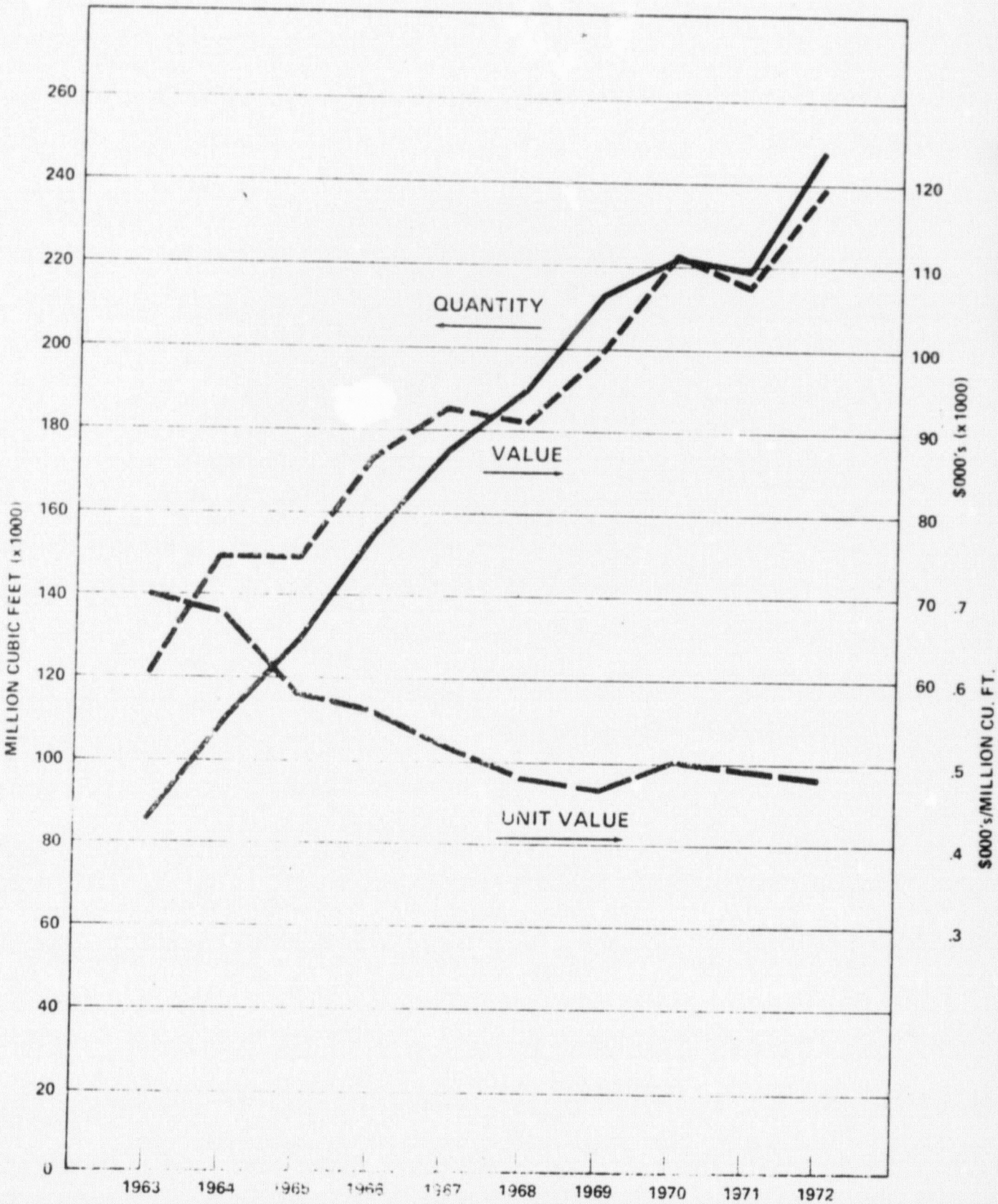


FIGURE 6

(BOC RX246 K)

OXYGEN SHIPMENTS

GAS PIPELINE



A 391

FIGURE 9

(BOC RX246 L)

BOC RX 246 L

OXYGEN SHIPMENTS

LIQUID – CYLINDER AND BULK

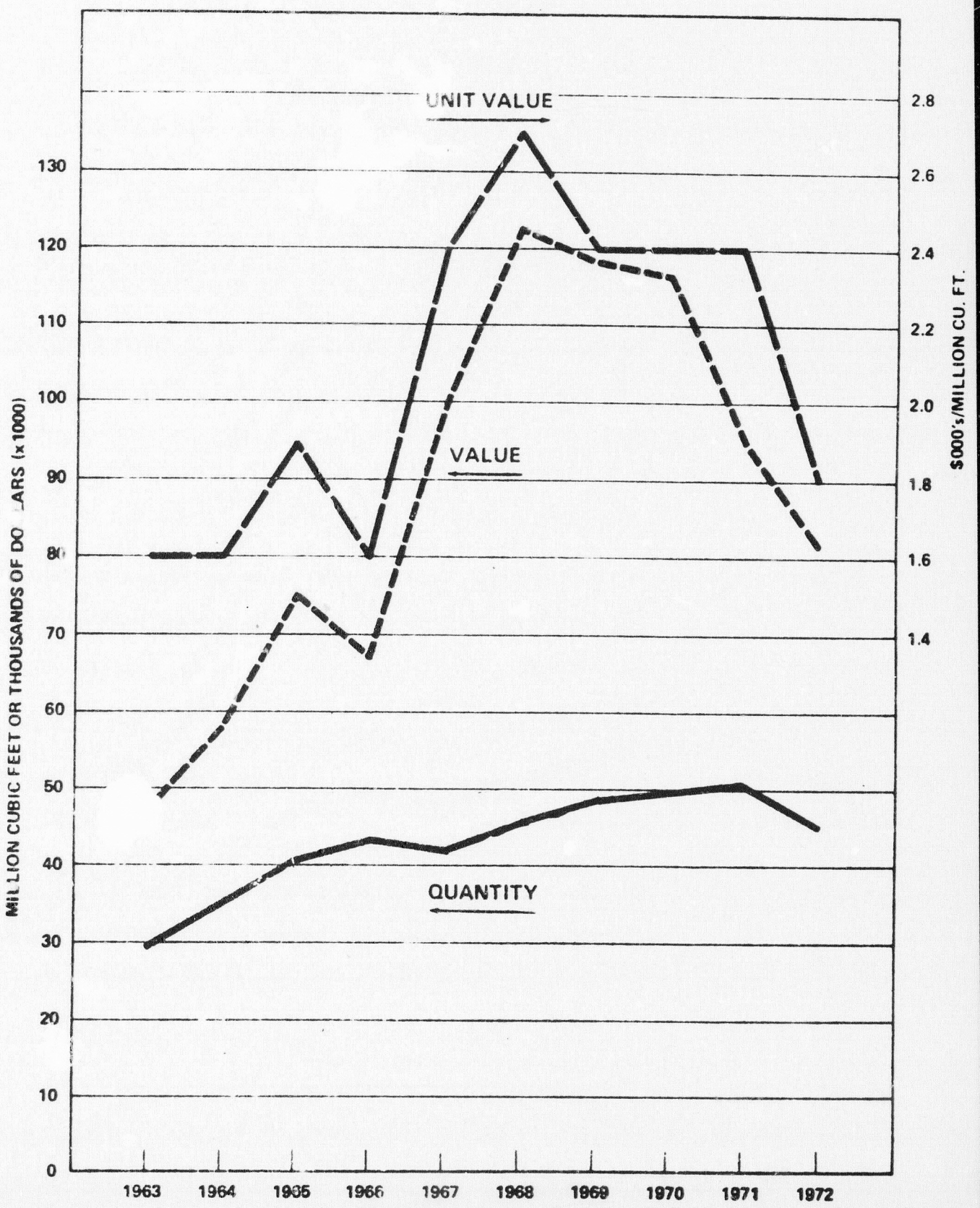


FIGURE 10
(BOC 246I)

NITROGEN SHIPMENTS

TOTAL

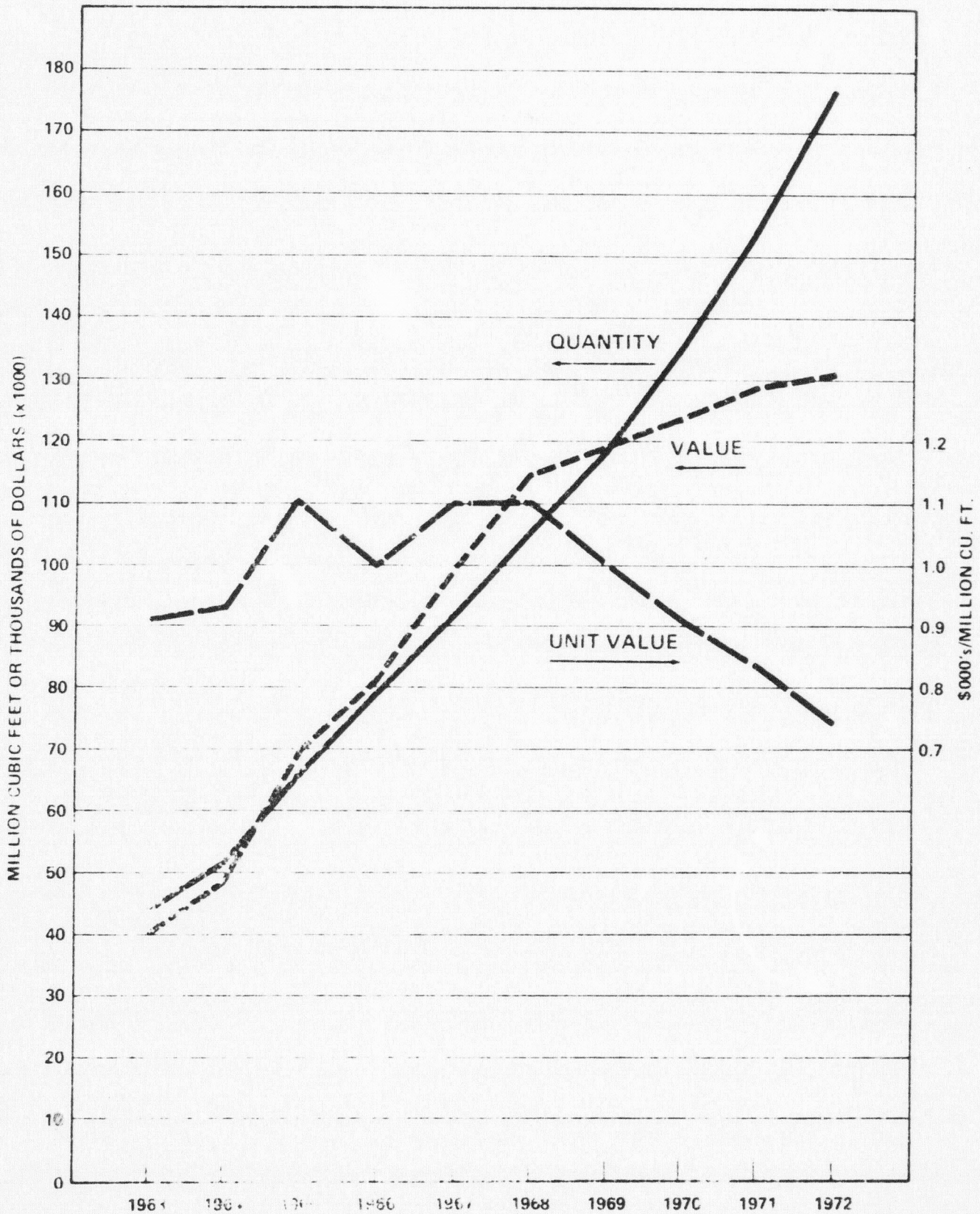


FIGURE 11

(BOC RX246 G)

NITROGEN SHIPMENTS

GAS PIPELINE

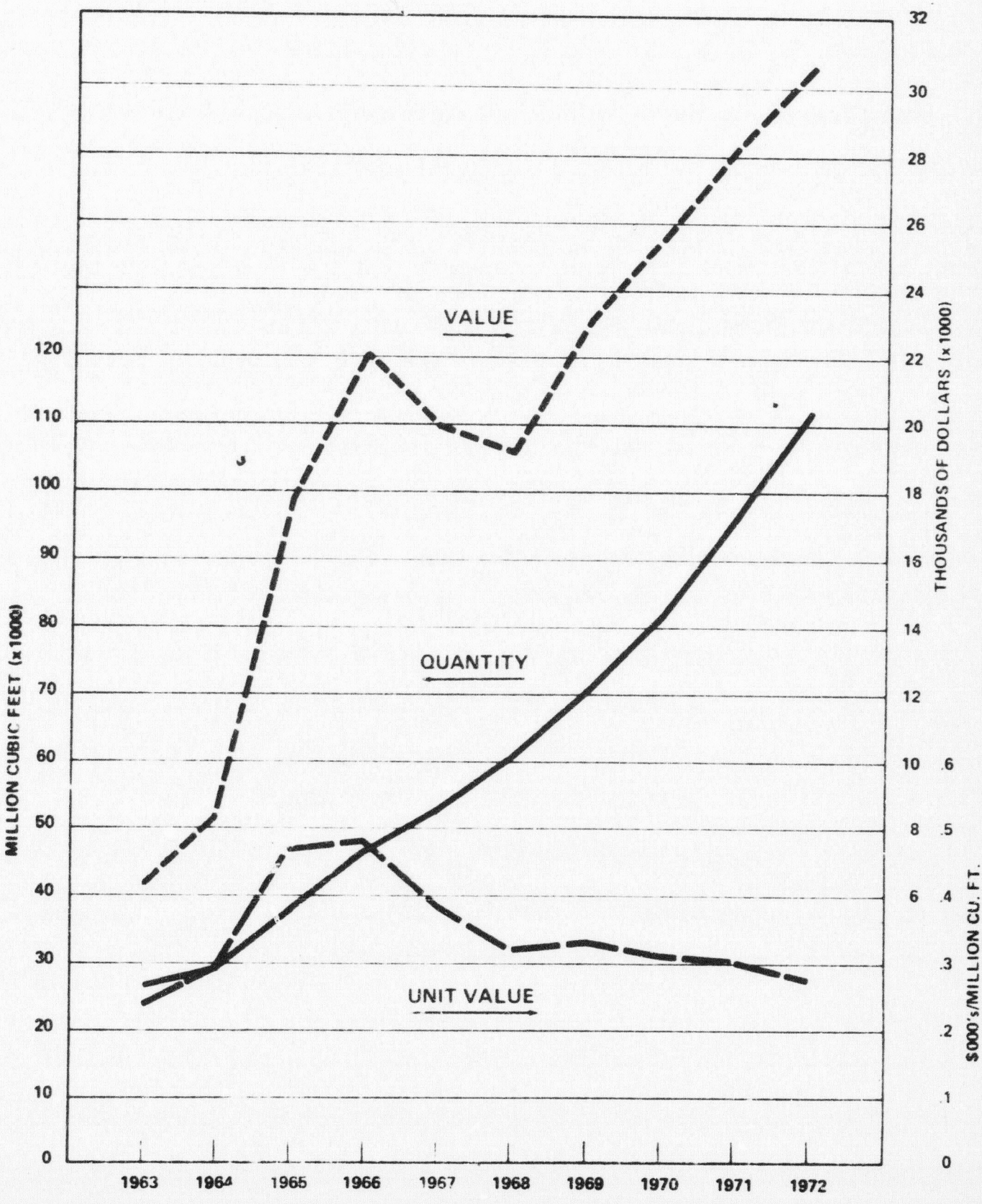


FIGURE 12

(BOC RX246 H)

NITROGEN SHIPMENTS

LIQUID CYLINDER AND BULK

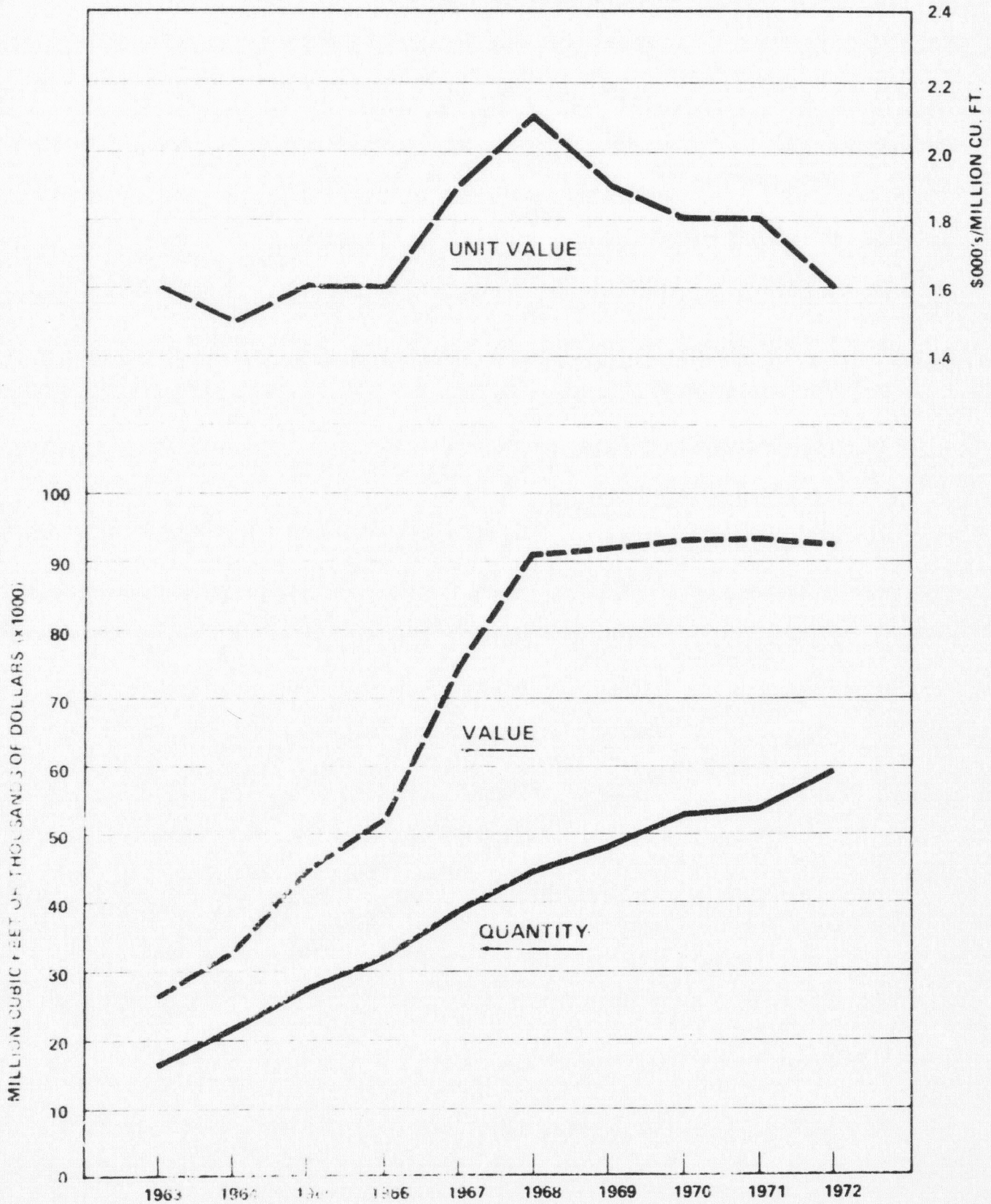


FIGURE 13

(BOC RX246 B)

ARGON SHIPMENTS

TOTAL

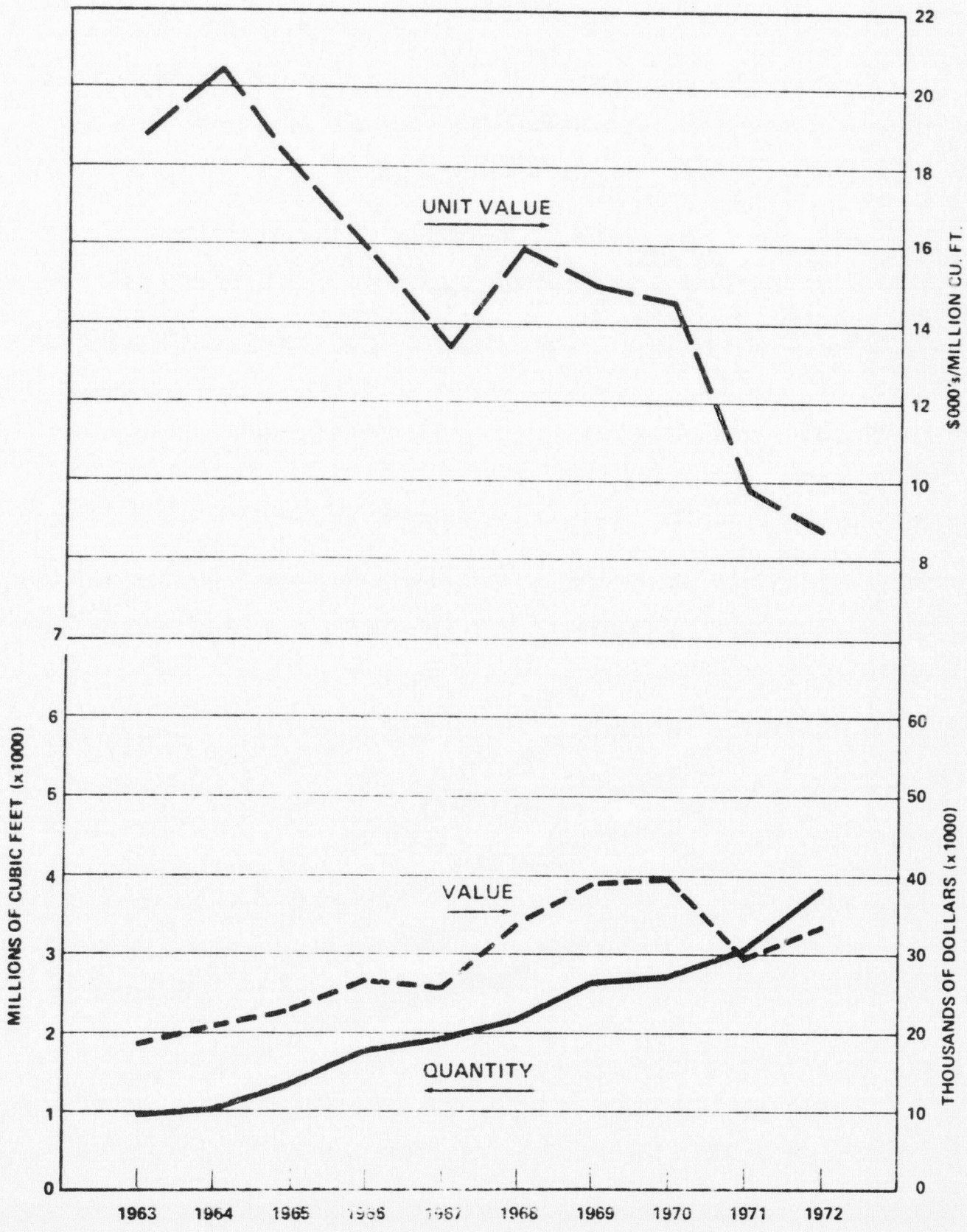


FIGURE 14

(BOC RX246 F)

HYDROGEN SHIPMENTS

TOTAL

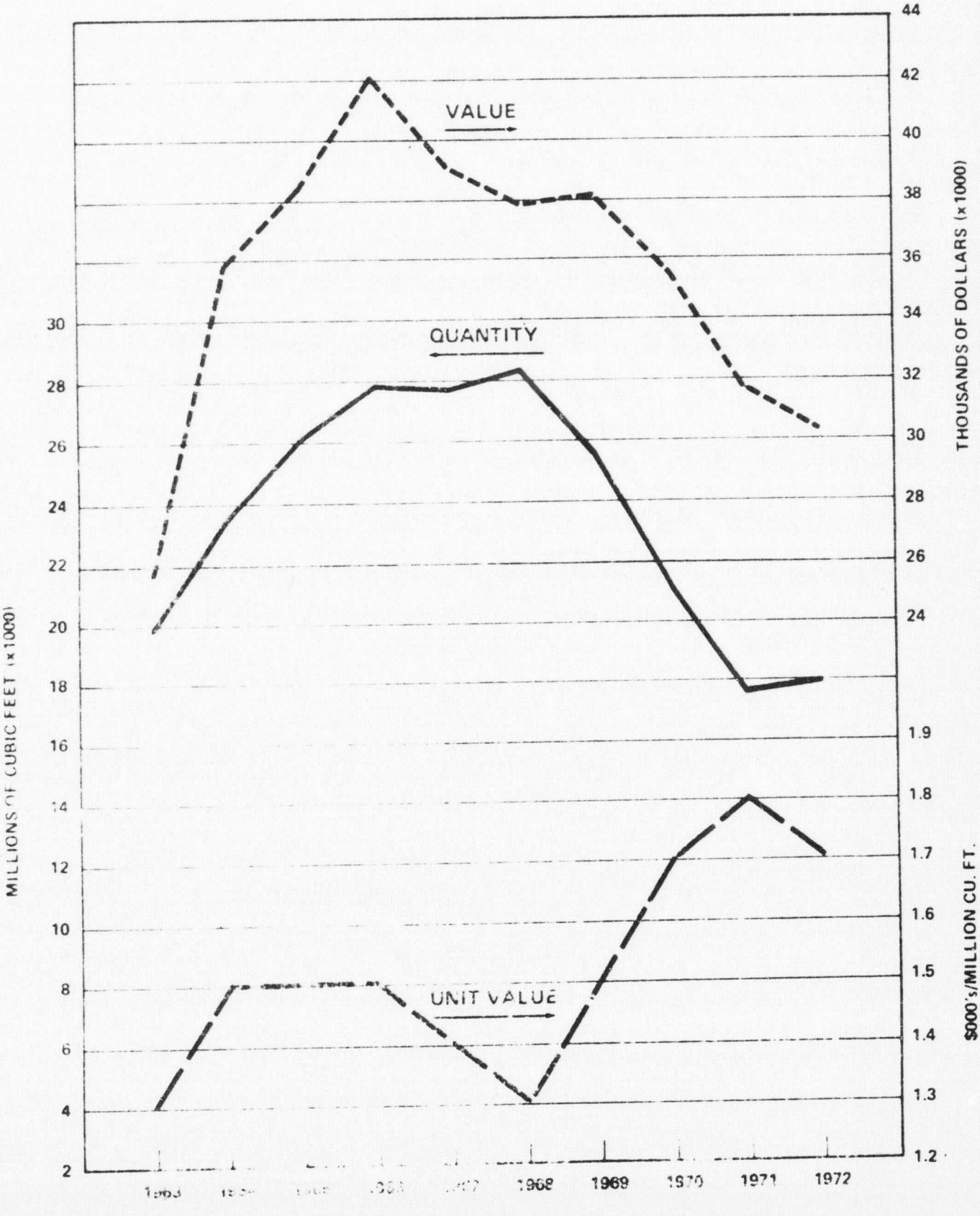


FIGURE 15
(BOC RX246 E)

CARBON DIOXIDE SHIPMENTS

TOTAL

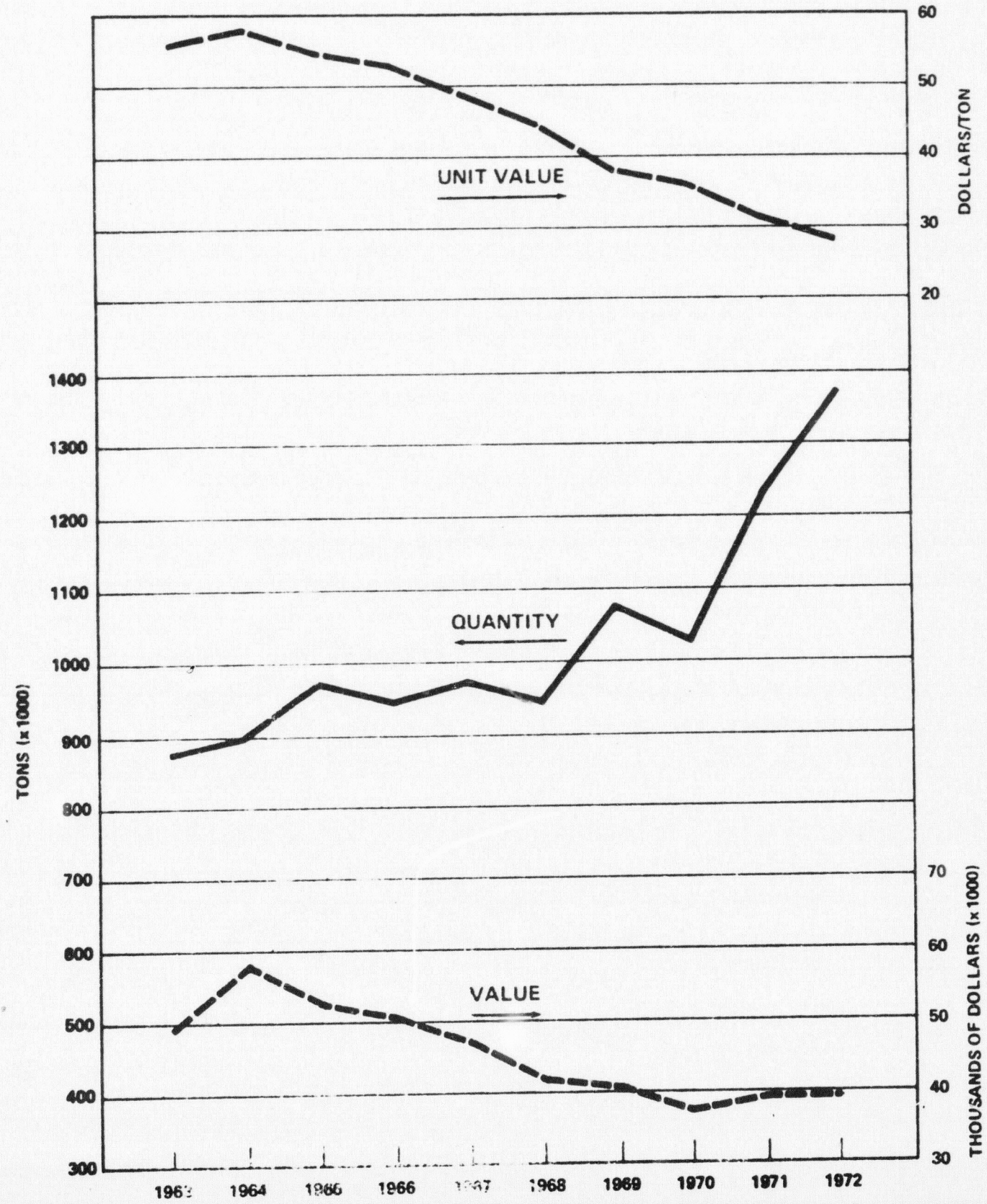
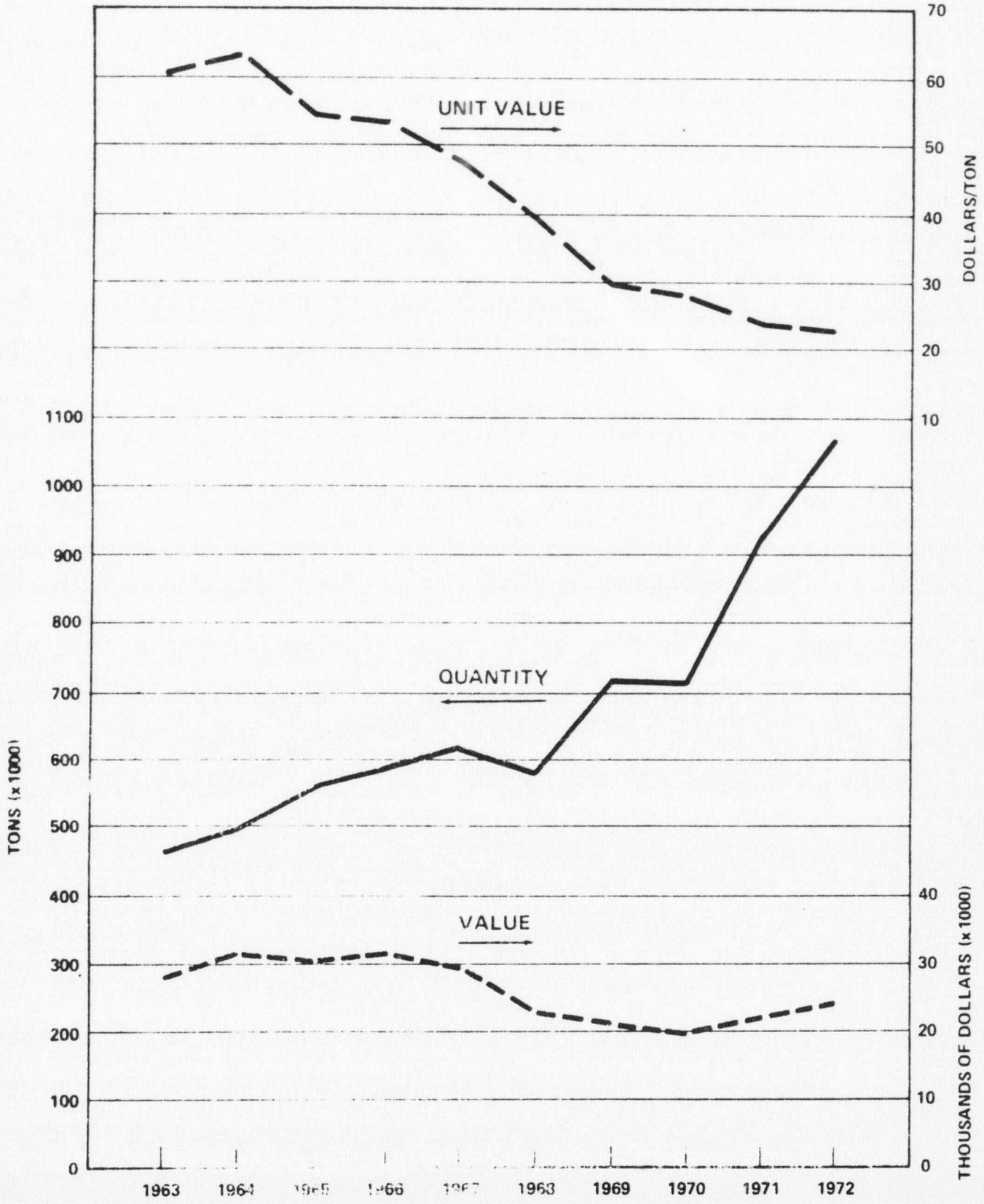


FIGURE 16
(BOC RX246 C)

CARBON DIOXIDE SHIPMENTS

LIQUID AND GAS



A 399

FIGURE 17

(BOC RX246 D)

BOC Rx 246 D

57

CARBON DIOXIDE SHIPMENTS

SOLID

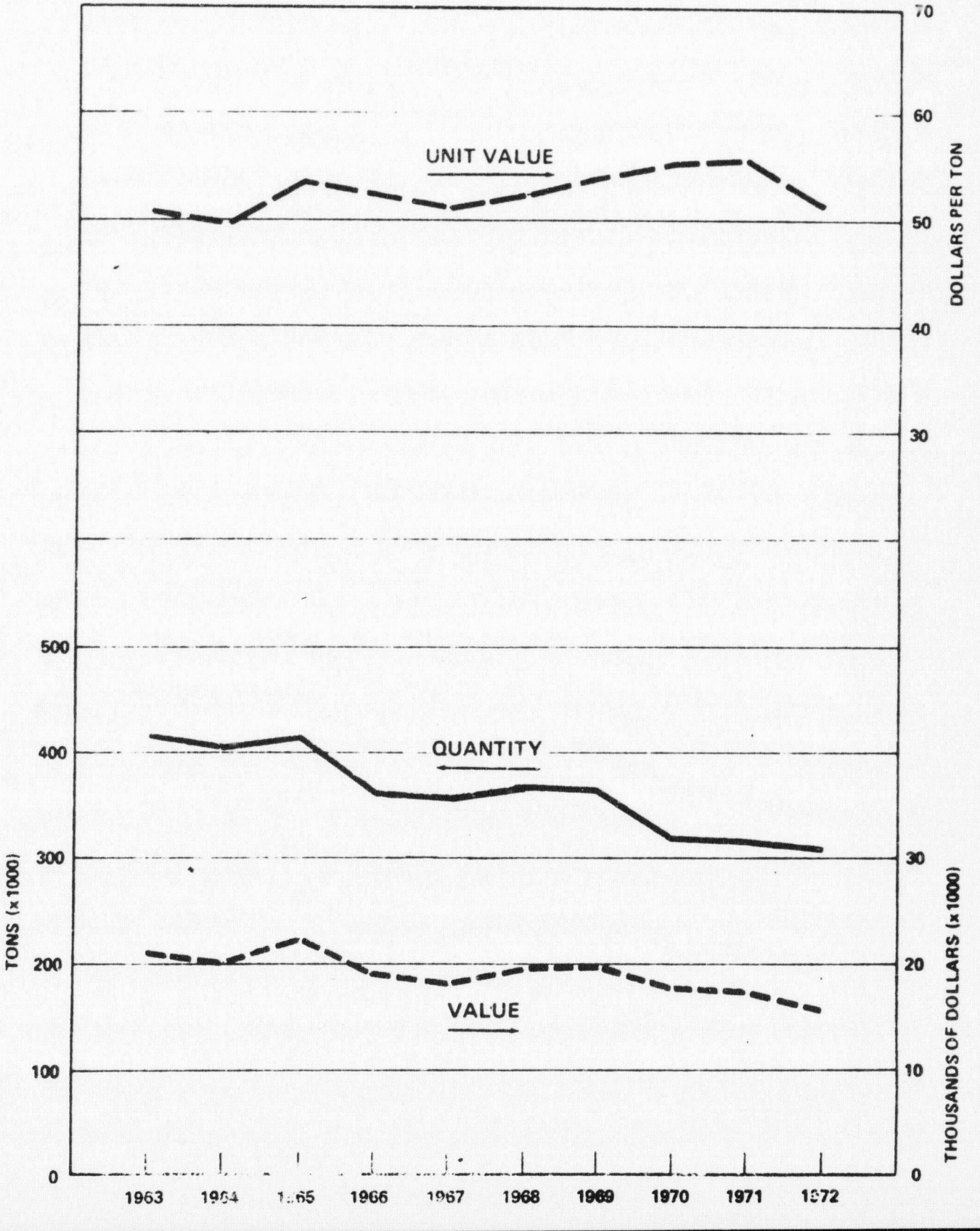


FIGURE 18

(BOC RX246 J)

NITROUS OXIDE SHIPMENTS

TOTAL

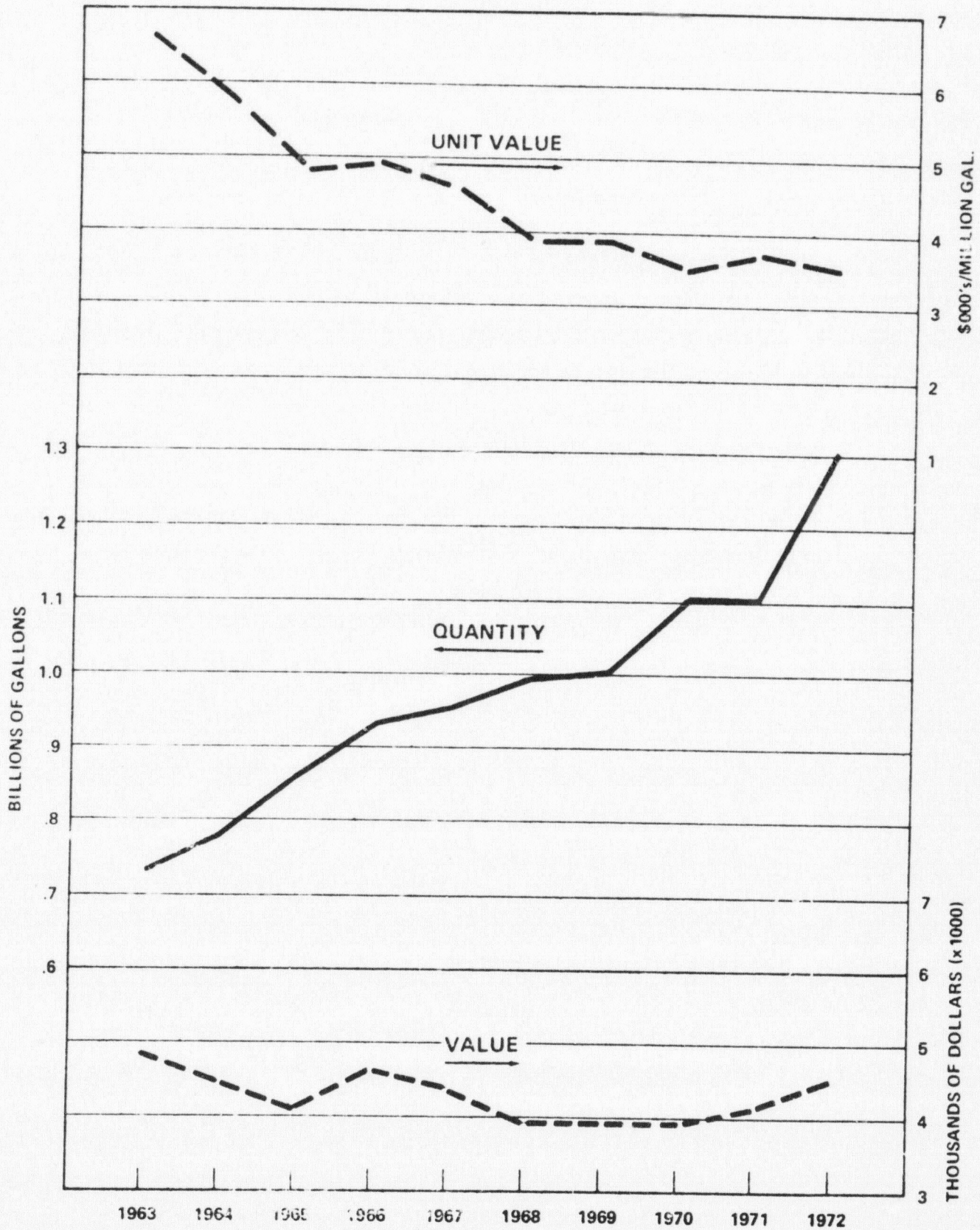
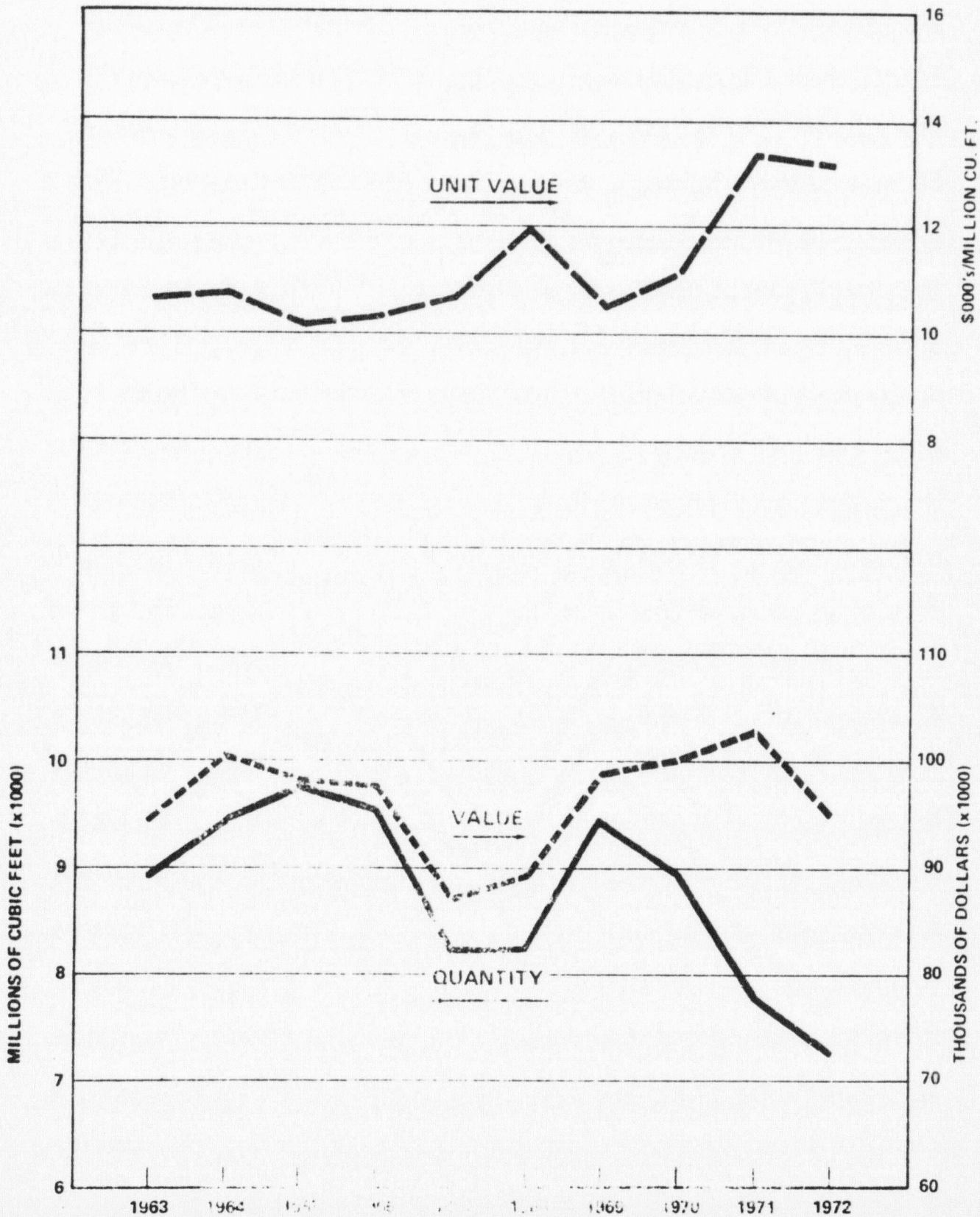


FIGURE 19
(BOC RX246 A)

ACETYLENE SHIPMENTS

TOTAL



supply the steel industry caused the industrial gas companies to build production capacity into those plants beyond the steel company's requirements in order to obtain product for sale in the merchant market at lower production costs than were otherwise available. (Giordano 1940-41; Kridl 2159) This further depressed prices for merchant gas. (Kridl 2159-65)

129 The sharp price decline in carbon dioxide also had its roots in a basic structual feature of the industrial gas industry. Carbon dioxide, as we have seen, is mostly produced as a by-product of the manufacture of ammonia. (Kridl 2174; see Flamm 267) Ammonia has been produced in ever-increasing quantities in recent years. Thus, there has been a continuous expansion in the availability of by-product carbon dioxide. (Kridl 2174)

2. Structural Factors Ensuring Price Competition and Limiting Prices In the Industrial Gas Industry

130. In addition to the evidence of energetic price competition in the gas industry, the hearing record reveals a number of important structural features of the industry which

tend to intensify price competition and to prevent any oligopolistic pricing practices.

(a) Backward Integration by Tonnage Users

131. We have already seen that there is significant backward integration by tonnage users -- a major segment of the market for industrial gases -- to supply their own needs. Further backward integration is at least a realistic possibility. Tonnage users of atmospheric gases, primarily basic manufacturing industries, concededly have the technological know-how and financial resources to produce atmospheric gases for themselves. (Flamm 296; Dempster 562-63; Kridl 2162-63) Moreover, there are numerous producers of air separation plants which compete vigorously to sell such plants to all comers, including those producing for their own requirements. (Smith 1681; Kridl 2162-63; Flamm 299; Dempster 562) Thus, the companies consuming most of the output of the industrial gas industry have it within their capability to become self-suppliers.

132. The industrial gas companies are fully cognizant of the inroads, both accomplished and potential, which backward integration can have on their business. Several have sold air separation plants to tonnage users for operation by the customer; and they are aware also of the availability of plants from foreign

suppliers. (Baker 2742-43, 442; Flamm 290-91, 299; Kridl 2162-63; Dempster 562; Smith 1666-72) Still more important is the fact that, when steel and chemical companies need tonnage supplies of gas, they normally solicit bids both for long-term tonnage supply contracts and for construction of the plant for self-operation. (Giordano 1929-30; see Smith 1683-85) Thus, the gas companies normally know, when they bid on a tonnage supply contract, that the customer is considering purchase of a plant as an alternative. Indeed, this record reveals that chemical companies, at least, expressly threaten to build and operate their own plants in order to secure better prices on bids for tonnage contracts (Kridl 2222-23) - and there is no reason to suppose that this tactic is peculiar to chemical companies. Thus, the decision on whether to buy a plant or enter into a long-term supply contract is typically a judgment as to whether the consumer can produce the gas for itself cheaper than it can buy it from an industrial gas company. (Giordano 1929-30; Smith 1683-85)

[illegible] This set of circumstances has important effects on pricing by the industrial gas companies. First, as Dr. Kridl testified, the feasibility of backward integration "places . . . a ceiling, an automatic ceiling [on] the price which the . . . suppliers of industrial gases for sale can charge the major users. if they attempt to charge any more [than] a reasonably low rate of return . . . it becomes automatically economical for the major

users to integrate back to make their own." (Kridl 2183)

134. Dr. Kridl's testimony is corroborated by Mr. Smith and Mr. Giordano who testified that the ability of major users to back-integrate drives the return on tonnage supply contracts toward the cost of the capital used to build the plant. (Smith 1683-85 Giordano 1929-30) This testimony was further confirmed by several industry participants during the course of the Perham-Greenfield study. (CX 232-J/N/R)

135. The effect of the threat of back-integration is well documented in the economic literature.[1/] As one economist states:

> "Large buyers can also issue credible threats to integrate vertically upstream, producing their own requirements of an input unless prices are held close to cost. Unlike potential outside entrants, they have an assured market, and therefore have no reason to fear the pricing reactions of established producers. When the buyer's demand is substantial enough to permit realization of all scale economies in producing for its own use, it can scarcely lose: either sellers restrain their prices in response to its threat, or if the threat fails, the buyer displaces them and consumes its own low-cost

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1/ The Commission and the Courts have held that reliance on such economic literature in Section 7 cases is entirely appropriate. Procter & Gamble Co., 63 F.T.C. 1465, 1549 n. 19 (1963), rev'd on other grounds, 358 F.2d 74 (6th Cir. 1966), rev'd on other grounds, 386 U.S. 568 (1967).

production. Numerous applications of this dual strategy are recorded in industry studies. Although some scale economies are apparently unattainable to firms integrating vertically, tin-plated steel prices have been restrained by the ability of the tin can manufacturers to begin plating their own steel, while tin can prices have been held in check by the threat (and in some cases the actuality) of upstream integration by large food canners. The auto manufacturers have kept downward pressure on glass window, electrical component, fabricated parts, and even cold-rolled steel sheet prices by their demonstrated willingness to produce for their own use whenever the prospect of cost savings becomes attractive.[1/] Markham reports that a large fertilizer manufacturer obtained repeated price concessions from a phosphate rock producer by threatening to reopen its dormant mines." F. Scherer, Industrial Market Structure and Economic Performance, 246-47 (1970) (footnotes omitted); see also J. W. Markie, Tin Cans and Tin Plate, 50-54, 110-14, 292-92 (1959); 1 S. Whitney, Antitrust Policies, 496-500 (1958); A. Kaplan, J. Dirlam & R. F. Lanzillotti, Pricing in Big Business, 172 (1958); J. Markham, The Fertilizer Industry, 113 (1958).

136. The threat of backward integration also has important effects on the merchant market, where it performs much the same price-restraining function as in tonnage.

137. Numerous industry witnesses testified that it is common practice in the glass industry to build tonnage plants somewhat larger than necessary to serve the tonnage customer

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1/ Ford Motor's operation of its own steel mill, documented in this record, is an example

and then sell the excess product in the merchant market. (Baker 2740-41; Giordano 1917-18, 1940-41; Kridl 2185; Smith 1744-46) By this practice, the gases companies can obtain gas for the merchant market at lower cost than experienced by smaller plants devoted solely to merchant production. (Giordano 1941; Kridl 2185, 2234) In fact, most production for the merchant market comes from such add-on facilities rather than from stand-alone merchant plants. (Baker 2740-41; Giordano 1917-20; Smith 1758-59)

138. As tonnage users are encouraged to back-integrate to supply themselves, so may they always be tempted to back-integrate into production for the merchant market. For if merchant prices rise, tonnage users will not only have an opportunity to economize by supplying themselves but they may also profit from merchant sales. Thus, the threat of back-integration acts also to restrain prices in the merchant market. (Kridl 2184-87)

139. Back-integration by tonnage users to supply the merchant market is not merely a theoretical possibility; self-suppliers today often have surpluses which they sell to distributors. (Cunningham 944-45; Flamm 354-55; Baker 2742-44) Whatever additional marketing expertise might be necessary to sell in the merchant market could be hired, a fact not disputed by any witness at the hearing. (Kridl 2210-12; Flamm 351-52; Dempster 564)

140. A number of tonnage users have shown active interest in backward integration to enter the merchant market. In 1968, U.S. Steel retained Arthur D. Little, Inc. to study the feasibility of entry into the merchant market in two areas -- based on tonnage plants which U.S. Steel would purchase to supply its own operations. (Karnath 2072-75; BOC RX 58) Northern Natural Gas, Phillips Petroleum and Exxon have also studied entry. (CX 232-Z-25/26; Baker 444) Significantly, the fact that these studies were undertaken was known to the industrial gas companies. (Flamm 354; Baker 443-46; see Karnath 2078) And it is noteworthy that Arthur D. Little regarded entry into the merchant market by U.S. Steel as wholly feasible, if rather costly. (BOC RX 58-N)

141. Mr. Baker of Air Products testified that he did not regard back-integrated users "as competitors or potential competitors". (Baker 2743-44) But, this opinion aside, Mr. Baker admitted virtually all of the facts discussed above. He conceded that large tonnage users, including U.S. Steel, National Steel, National Lead and Ford, own and operate their own air separation plants; indeed, Air Products built air separation plants for these companies. (Baker 442-43) He admitted that they have the financial resources to enter the industrial gas industry. (Baker 443) He admitted that economies of scale make addition of excess capacity to tonnage plants both common and desirable for sale in the merchant market. (Baker 393-94, 2734, 2740-41) He acknowledged that tonnage producers for self-use presently sell excess product to industrial gas companies and to distributors. (Baker

2742-44) Further, he admitted that he was aware of numerous studies of possible entry into the industrial gas industry of tonnage users, including U.S. Steel, Phillips Petroleum and Exxon. (Baker 443-46) Moreover, although Mr. Baker was called as a rebuttal witness by complaint counsel, he did not deny any of the facts concerning the significance of tonnage production to the industrial gas companies, the manner in which tonnage contracts are bid, the factors considered by tonnage users in deciding whether to buy a plant or a tonnage supply contract, or the effects of these facts on prices in the industrial gas industry.

(b) The Cost Structure of the Industrial Gas Industry

142. A significant feature of the gases industry is the fact that fixed costs are quite high in relation to the total cost of producing atmospheric gases. The largest elements of cost are depreciation on the physical plant and power cost. Depreciation is of course a constant,and even power -- in view of the typically high demand charge -- is really a fixed cost. (Giordano 1947-48; see Dempster 549-50)

143. These high fixed costs have important consequences for pricing. Mr. Giordano testified (1948):

> "[W]hat it tends to do to the merchant gas business, is to encourage you to load the plant. If you don't load the plant, you are stuck with very high fixed costs and this has been one of the elements that has caused price cutting and severe price competition when there is oversupply."

144. Mr. Giordano's conclusion is borne out by the economic literature, which indicates that high fixed costs tend to lead to extreme price competition and to prevent oligopolistic pricing even in highly concentrated industries. E.g., F. Scherer, Industrial Market Structure and Economic Performance 192-98 (1970).

(c) Concentration and Economic Power On the Buyers' Side

145. As we have seen, the most important segment of the industrial gas business is tonnage supply of oxygen and nitrogen. We have seen also that the principal consumers of tonnage oxygen and nitrogen are some of our largest basic manufacturing industries: steel, aluminum, chemicals, glass, petroleum refining and electronics.

146. The firms in these industries are, for the most part, enormous in comparison with the industrial gas companies. For example, Ford Motor Company ranks third on the Fortune 500 having total sales in 1973 of $23.0 billion and total assets of $13.0 billion. United States Steel ranked thirteenth on the Fortune 500, with 1973 sales of $7.0 billion and assets of $6.9 billion. Other tonnage users mentioned in this hearing record include Bethlehem Steel (24th with sales of $4.1 billion and assets of $3.9 billion), Allied Chemical (95th with sales of $1.7 billion and assets of $1.8 billion), Wheeling-Pittsburgh Steel (213th with sales of $761 million and assets of $661 million), and Armco Steel (55th with sales of $2.4 billion and assets of $2.3 billion).

Hence, the major customers of the industrial gas companies are very large, have great economic power, and are surely highly sophisticated purchasers.[1/]

147. The industrial gas companies are of far less economic consequence -- and power. With the exception of Union Carbide, whose gases business represents only a small fraction of its business (compare Flamm 220-21 with BOC RX 188-N; BOC RX 188-L), none of the industrial gas companies ranked higher than 263rd on the Fortune index and only three ranked among the nation's 500 largest industrial corporations.[2/]

148. Moreover, the industries which are the major customers of the industrial gas companies are themselves concentrated. According to the Bureau of Census, the proportion of industry shipments accounted for by the eight largest companies were as follows for the major industries consuming industrial gases: steel (SIC 3312)-65%; primary aluminum (SIC 3334)- apparently 100%; petroleum refining (SIC 2911)-57%; flat glass (SIC 3211)-over 92%; and electronics (SIC 3671-74)-65% to 99%.[3/]

1/ Fortune 232-51 (May 1974)

2/ Ibid. Airco ranked 263rd, Air Products 360th and Chemetron 392nd.

3/ Bureau of the Census, Annual Survey of Manufacturers-1970, Value-of-Shipment Concentration Ratios. Official notice may be taken of this document.

149. The import of the relative economic power, concentration and sophistication of the major customers of the industrial gas industry is that the concentration of the industrial gas industry, even if it be high, is not a reliable indicator of the presence or absence of oligopolistic pricing or a noncompetitive business environment. It is well established in economic theory that, where there is concentration on both sides of the market, "the final outcome of the relation of prices to costs -- and with it allocation, income distribution, and perhaps total employment -- is made logically uncertain over a significant range, and an observation of actual behavior is the only reliable guide." J. Bain Price Theory 366 (1952), accord, J. Bain, Industrial Organization 1940-41 (1959).1/

1/ Professor Bain's works have regularly been cited by the Supreme Court and the Commission. Infra, p. 201.

(d) Product Homogeneity

150. A final factor tending to assure vigorous price competition in industrial gases is the homogeneity of the products. Each gas is a pure chemical element or compound, produced at commercial standards of purity. There is absolutely no difference between the oxygen manufactured by Union Carbide and the oxygen manufactured by any other producer. (Flamm 304-05) Advertising plays no significant role in sales. (Giordano 1938) Thus, we are dealing with products for which differentiation is utterly impossible. This leaves price and service as virtually the only bases on which the industrial gas companies can compete. (See Flamm 304-05; Dempster 555-56) And, as we have seen, in these areas the testimony is unanimous that they compete vigorously.

3. Profitability of the Industrial Gas Companies

151. The industrial gases industry has not been profitable in comparison to other manufacturing and chemical industries. Of the eight largest industrial gas producers, six are publicly held and so make some financial information available. It is clear that their return on stockholders' equity is quite low. As Figure 20 (BOC RX 244) demonstrates, during the last ten years, with the exception of Big Three -- a company operating only in the expanding Gulf region -- these companies have regularly had returns on stockholders' equity well below the FTC average for

all chemical companies and for all manufacturing companies. (BOC RX 244; Kridl 2192-93) Similarly, Figure 21 (BOC RX 243) shows that the return on total invested capital -- a more accurate indication of the profitability of a business since it takes into account loan capital (Giordano 2008) -- has also been quite low. (BOC RX 243; see Kridl 2187-88)

152. While the foregoing data relate to both gas and non-gas operations of the companies reporting, the evidence indicates that the picture is even worse when limited to industrial gas operations. Mr. Giordano of Airco estimated that the return on total invested capital for gases operations of gases companies is in the 6% to 8% range -- which he called "not high". (Giordano 2008, 2026-27) But his estimate itself seems very high -- the "Mississippi River" compilation of the reports of three gases companies shows rates of return in gases averaging consistently under [D 2]. (BOC RX 254) And Dr. Kridl pointed out that those companies which are widely diversified had higher rates of return than those which confined their operations largely to gases. (Kridl 2196-98)

FIGURE 20
(BOC RX 244)

PERCENT RETURN ON STOCKHOLDERS' EQUITY
(After Taxes)

	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963
Airco	7.0	6.9	7.1	6.6	7.8	7.8	10.3	12.8	12.1	9.4	9.0
Air Products	11.4	9.8	9.6	9.8	10.1	9.4	9.7	9.3	10.4	10.0	10.7
Chemetron	6.2	5.0	2.6	4.9	7.4	7.3	10.7	14.8	13.6	9.8	8.0
Big Three	12.9	11.3	13.7	15.4	12.1	12.4	13.8	16.3	15.6	17.5	n.a.
Burdett	6.0	(16.9)	(43.2)	(18.2)	0.9	5.3	6.9	7.5	5.4	6.6	n.a.
Union Carbide	13.8	10.7	8.3	8.7	10.5	9.2	10.3	15.6	16.7	15.2	[illegible]
All Chemicals	14.9*	12.8	11.8	11.5	12.8	13.3	13.1	15.1	15.3	14.4	[illegible]
All Manufacturing	12.6*	10.6	9.7	9.3	11.5	12.1	11.7	[illegible]	13.0	11.6	[illegible]

*Based on 1st three quarters of 1973.

FIGURE 21
(BOC RX 243)

PERCENT RETURN* ON TOTAL
INVESTED CAPITAL

Year	Airco	Air Products	Chemetron	Big Three	Burdett	Union Carbide
1973	4.4	7.2	4.5	9.8	1.1	9.5
1972	4.1	5.7	3.5	8.9	(2.5)	7.3
1971	4.2	5.1	1.8	7.1	(7.4)	5.5
1970	3.8	5.3	3.2	6.9	(4.3)	5.8
1969	4.6	5.6	4.7	6.6	0.3	6.9
1968	4.9	5.3	5.3	7.2	2.3	6.0
1967	6.5	4.8	9.2	7.6	2.7	6.7
1966	8.1	4.6	10.1	9.7	3.6	11.3
1965	7.6	4.5	9.7	9.5	3.2	11.7
1964	5.8	4.7	7.1	7.4	5.4	10.9
1963	5.9	5.0	5.7	n.a.	n.a.	10.2

*Percent return = Net income divided by total invested capital x 100.

4. Innovation

153. Industry witnesses were unanimous that there is vigorous competition among the industrial gas companies in research and development. (Dempster 556; Baker 385-86, 440; Giordano 1920-23) And the gases companies have continually upgraded their production facilities. (Kridl 2218-19)

5. Capacity-Output Relationships

154. Until sometime in 1973, there had been an oversupply of atmospheric gases in many areas for many years. (Giordano 1941-42; Flamm 322-23; Dempster 557) Within the last year or two, largely concurrently with the duration of federal price controls, modest product shortages of atmospheric gases have developed in some geographic areas, in the area of one or two percent -- while surpluses persist elsewhere. (Giordano 1936; Flamm 238-40) However, Mr. Dempster of Liquid Air, called by complaint counsel, testified that the gases companies have the resources to fill the shortages and are competing to do so (Dempster 558; see Giordano 1962-63).

155. Leaving aside the air separation gases, this record is bare of any suggestion of a shortage. There

is an oversupply of hydrogen and helium today. (Flamm 240) There is excess acetylene production capacity. (Ibid.) There are no significant carbon dioxide shortages. (Giordano 1962)

156. The development of some product shortages following the imposition of price controls is not surprising. This has been a common phenomenon for most basic materials industries. See 60 Federal Reserve Bulletin 1-4, A 62 (1974) (capacity utilization very high). And of course shortgages are generally regarded as a likely consequence of price controls. E.g., C. J. Grayson, Confessions of a Price Controller 205 (1974).

6. Concentration

157. At the outset of this proceeding, complaint counsel stated that they alleged a market only for all industrial gases and would not rely on any markets or submarkets for individual gases. (74-75) Accordingly, no evidence with respect to the performance of individual firms in specific gases was introduced. Hence, it is impossible to determine the concentration of markets in specific gases in the event they are the relevant lines of commerce.

158. While the propriety of a market consisting of all industrial gases is sharply disputed by respondents, it is appropriate that facts be found with respect to such an assumed market, whether for the purposes of the initial decision or for use by the Commission or a reviewing court. Since gross data concerning all industrial gases included within the Census Bureau's Standard Industrial Classification code 2813 was introduced, it is possible and proper to make findings with respect to that category, irrespective of whether the initial decision concludes that it is a relevant line of commerce within the meaning of Section 7.

159. Establishing the concentration of the industrial gas industry requires two sets of figures. First, there must be a measure of the output of the leading firms. For this purpose, complaint counsel have relied exclusively on a stipulation as to the total value of shipments of industrial gases, f.o.b. plant, reported by seven firms to the Bureau of the Census for 1972.[1/] (CX 325) Second, there must be evidence as to total output, so that the shares of the asserted leaders may be calculated. For this purpose, complaint counsel relied on the 1972 Census of Manufacturers

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1/ The data for Union Carbide appear in the hearing record rather than in the stipulation. (Flamm 221)

and the 1972 Current Industrial Reports for industrial gases compiled by the Bureau of the Census. (CX 296; CX 312)

160. These are the shipments reported by the named firms under SIC code 2813:

Union Carbide	$153.0 million
Air Products & Chemicals	$107.0 million
Airco	[D 3]
Chemetron	$ 60.5 million
Liquid Air	$ 33.5 million[1/]
Liquid Carbonic	[D 4]
Big Three Industries	[D 5]
Burdett of Cleveland	$ 12.7 million

161. The 1972 Census of Manufacturers reported that the total value of all shipments of industrial gases was $648.8 million. (CX 296-C) However, the data collected by the Census Bureau are subject to several significant limitations which prevent their use as a meaningful universe.

162. First and most important, the value of "shipments" excludes by definition gases produced for consumption in the producing plant, since such gases are not shipped.

1/ The parties stipulated that the value of shipments by Liquid Air in 1972 was [D 6] . However, Liquid Air acquired two other industrial gas companies effective December 31, 1972. (CX 335-P) Mr. Dempster testified that the total value of shipments for Liquid Air in 1972 on a pro forma basis including the acquisitions was $33.5 million. (Dempster 516) Since Liquid Air's acquisitions were an accomplished fact by the time with which we are concerned -- late 1973 -- it is appropriate to use the pro forma figures for Liquid Air, as they are a more accurate reflection of the structure of the industry at the relevant time.

(CX 296-E) Indeed, the Census report shows a substantially greater quantity of gas produced than shipped. (CX 296-C)

163. Second, the Census data exclude "hydrocarbon gases, such as propane, butane and propylene, or halogenated hydrocarbons and cyclopropane", as well as sulfur dioxide and chlorine. (CX 296-C n. 9) All of these gases would seem to be included within the definition of industrial gases contained in the complaint -- "gases in compressed, liquid and solid form, including acetylene . . ." (Cpt. ¶ 1[a]) -- and several, at least, were regarded as industrial gases by many witnesses. (Flamm 286, 213, 341; Smith 1797; Kridl 2135-39) Significantly, the Census Bureau excludes propane, butane, propylene, halogenated hydrocarbons and cyclopropane not because they are not industrial gases, but because they "are reported to the U.S. Tariff Commission" instead of to the Census Bureau (CX 296-C n. 9). No reason appears in this record as to why the addressee of a report should determine whether a gas is in or out of the universe.

164. Third, the Census data exclude the value of helium produced in government-owned plants. (CX 296-C n. 1) But the record suggests that the Bureau of Mines accounts for about one-half of all United States helium

sales. (CX 232-Z-6)

165. Fourth, the Census data exclude hydrogen and nitrogen used in the manufacture of synthetic ammonia, which is a major use of those gases, as well as hydrogen vented, used as fuel and produced in petroleum refineries for captive use, another major use of hydrogen. (CX 296-C nn. 6, 7; Kridl 2133-34, 2139-40)

166. Despite these limitations, it is possible to make estimates covering some of these omissions.

167. While the Census data on value of shipments neglect gases produced for consumption in the producing plant, the Census Bureau has collected data on the quantities of gases produced for such consumption. In 1972 these were (CX 312 C/D):

acetylene	4.3 billion cubic feet
hydrogen	40.6 billion cubic feet
nitrogen	15.5 billion cubic feet
oxygen	51.5 billion cubic feet

168. The value of this additional production can be estimated by multiplying these quantities by the respective unit values of shipments of each of these gases (Figures 7, 10, 14, 19). This yields the following additional values of industrial gases, f.o.b. plant, produced in the United States in 1972:

acetylene	$ 56.3 million
hydrogen	$ 68.8 million
nitrogen	$ 11.5 million
oxygen	$ 36.0 million
	$172.6 million

169. Adding the total estimated value of these four gases produced for consumption to the total value of shipments reported to the Census Bureau results in a total value of industrial gases produced in the United States in 1972, f.o.b. plant, of $821.4 million. This figure remains an understatement due to the exclusion of important amounts of hydrogen, nitrogen and helium and the total exclusion of hydrocarbon gases, halogenated hydrocarbons and certain other products.

170. It is possible to make a similar adjustment to compensate for the omission from the Census data of propane, propylene and butane -- by reference to data collected by the Tariff Commission. According to the Tariff Commission, the total sales of these products in 1972 were:[1/] propane - $107.4 million, propylene - $111.8 million, and butane - $4.4 million, or a total of $223.6 million. These sales data can be reduced to approximate value of shipments, f.o.b. plant, by use of an appropriate

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1/ BOC RX 262-E.

distribution factor.[1/] So reduced, the approximate value of shipments, f.o.b. plant, of propane, propylene and butane in 1972 was $169.9 million. Thus, if propane, propylene and butane were included as industrial gases, as various witnesses felt appropriate, the total value of shipments of industrial gases in 1972, f.o.b. plant, subject to the other limitations noted above, was approximately $991.3 million.

171. Employing this figure, the market shares of the industrial gas companies are approximately:

Union Carbide	15.4%
Air Products	10.8%
Airco	[D 7]
Chemetron	6.1%
Liquid Air	3.4%
Liquid Carbonic	[D 8]
Big Three	[D 9]
Burdett of Cleveland	1.3%

172. On the basis of these figures, the four largest firms accounted for [D 10] of the total value of industrial gases produced in the United States in 1972

1/ The hearing record contains data on both sales and value of shipments, f.o.b. plant, for Union Carbide, Liquid Air and Alabama Oxygen. (Flamm 220-21; Kimerling 856, 889-92; compare Dempster 547 with CX 325) If one takes the average proportion which the value of shipments reported by companies to the Census Bureau comprised of their total sales, the result is a factor enabling one to approximate the f.o.b. shipment value of similar products.

and the eight largest accounted for 51.9%.[1/]

173. Of course, these figures are overstated because they omit hydrogen produced in petroleum refineries for captive use and nitrogen and hydrogen used for production of ammonia and other purposes.[2/]

1/ Even if the value of propane, butane and propylene is excluded, the market shares are: Union Carbide - 18.6%, Air Products - 13.0%, Airco - [D 11], Chemetron - 7.4%, Liquid Air - 4.1%, Liquid Carbonic - [D 12], Big Three - [D 13] and Burdett of Cleveland - 1.5%. The four largest firms would account for [D 14] and the eight largest for 62.6%.

2/ It is possible to estimate roughly the value of hydrogen produced in petroleum refineries for captive use, for prior to 1969, the Census Bureau collected partial data for such production. (BOC RX 53-D n.5) Between 1968, when such data was last collected, and 1969, the Census Bureau showed a drop in hydrogen production from 201.8 billion cubic feet to 64.8 billion cubic feet, most of which is attributable to the cessation of reporting of such hydrogen. (Ibid.) Hence, the amount of hydrogen produced by petroleum refineries for captive use appears to have been about three times the volume produced for other purposes and reported to the Census Bureau. Assuming the same ratio held in 1972, it is estimated that approximately 175 billion cubic feet of hydrogen, having an approximate f.o.b. plant value of $53.3 million dollars, was produced for this purpose.

174. The foregoing discussion has assumed that the value of shipments data calculated on an f.o.b. plant basis is a measure reasonably calculated to shed light on the relevant positions of the industrial gas companies in a hypothetical market for industrial gases. The record, however, indicates that the use of value of shipments f.o.b. plant rather than actual sales data results in serious distortions.

175. The universal industry practice is to sell gases on a delivered-price basis. (Kimerling 889-90; Giordano 1965) Thus, f.o.b. plant data is not generated in the normal course of the business of the gas companies, is not relied upon by them in their business, and is estimated by them solely in order to respond to inquiries from the Bureau of the Census. (Kimerling 889-91; Giordano 1963-67) This makes the Census figures somewhat unreliable.

176. Complaint counsel's first witness in this case, Mr. Flamm of Union Carbide, deprecated the reliability of the Census figures. When asked to state Union Carbide's total shipments of industrial gases as reported to the Census Bureau, Mr. Flamm said:

> "[W]ith the stating of that figure I would like to qualify or give an editorial comment

> of my concern over the lack of any significant validity of the figure. So, if I state the figure, I would like to qualify it. * * * The figure as reported was approximately $153 million. However, due to the very vague single line definition in the instructions from the Bureau of Census which merely says report for the various volumes -- by the way, we believe volumes are good data -- merely says report the F.O.B. value at the various producing locations. That word or that phrase 'F.O.B. value' is undoubtedly defined differently, I would guess, by everyone in the industry. I know when we reviewed this recently we changed our minds as to how it should be defined. So we do not assign any credibility to that figure at all and do not use it in-house. It is merely reporting a request from the Department of Commerce. In fact, if we were to look at that figure today, our best judgment in 1972 would have been about $120-125 million on the same volumes that the $195 million were reported." (Flamm 220-21)

177. Examination of the sales and value of shipments reported by the few companies for which data are available shows wide disparities in the proportion of sales accounted for by value of shipments, f.o.b. plant. For example, Union Carbide reported delivered sales of $195 million versus shipments f.o.b. plant of $153 million. (Flamm 220-21) Thus, its reported shipments f.o.b. plant were 80% of its delivered sales. Liquid Air, on the other hand, reported shipments f.o.b. plant of [D 15] and Mr. Dempster testified that its total sales were $26.2 million. (Dempster 547) Thus, shipments f.o.b. plant for

Liquid Air were only [D 16] of its total sales. And Alabama Oxygen computed its shipments f.o.b. plant by deducting an arbitrary 15% from its delivered sales. (Kimerling 891-92)

178. This wide variation supports Mr. Flamm's suggestion that there were widely differing interpretations of the meaning of "value of shipments, f.o.b. plant" used by gas companies in responding to inquiries from the Bureau of the Census. These variations necessarily had unpredictable effects on the relative market shares of the industrial gas companies; the result is to render any market share estimates employing Census Bureau data inherently unreliable.

179. Subject to all of the limitations of the Census Bureau's value of shipments data that are discussed above, the data do indicate that there has been a trend toward deconcentration of the industrial gas industry. The only data available for assessing such a trend is the naked value of shipments data for SIC code 2813 - without even adjusting for the value of gases produced for consumption in the producing plant. Calculating the percentage of the total value of shipments, f.o.b. plant, for the four and eight largest companies in 1972 on the basis of the stipulation entered into by the parties plus the relevant record evidence regarding Union Carbide and Liquid Air, and using the historical

concentration ratios for this industry computed by the Census Bureau (BOC RX 72-E; CX 325; Flamm 221; Dempster 516), we have the following:

Value of Shipments

Percentages Accounted for by

	4 largest companies	8 largest companies
1972	[D 17]	79.3
1967	67	84
1966	72	88
1963	72	86
1958	79	88
1954	84	88
1947	83	88

(4)

Geographic Market

180. The record is incomplete concerning the relevant geographic market. The evidence suggests that there may be a national market for the sale of tonnage oxygen, nitrogen and hydrogen, i.e., for long-term, high-volume supply contracts involving the construction of on-site plants. However, the evidence shows also that high transportation costs preclude the existence of a unitary national market for the sale of most gases in merchant quantities.

A. Tonnage Gas

181. The three largest gas companies, Union Carbide, Air Products and Airco, have sold tonnage supply schemes throughout the United States. (See Flamm 231; Baker 395-96; Smith 1732; Giordano 1938)

182. The smaller companies which sell gas in tonnage quantities do not sell nationwide. Chemetron does not market in the Pacific Northwest, Northern California and parts of the Southwest. (Cunningham 920-21) Big 3 sells only in the southern part of the country. (Flamm 321) Liquid Air sells no significant amount in the Northeast and Midwest. (Dempster 544) Burdett of Cleveland sells primarily in the Midwest. (Loveman 580) The record is silent as to whether any of these companies has ever bid for tonnage supply schemes outside of its usual geographic area. It would be difficult for these companies to obtain contracts for

tonnage supply schemes outside of their own areas because they would not be able to provide their own backup capacity. (See Proposed Findings 250-52, 306, infra)

B. Merchant Gas

183. The cost of distributing merchant quantities of industrial gas is about equal to the cost of producing the gas. (Giordano 1939) This high distribution cost limits the distance to which most industrial gases can be shipped economically. It is economically unacceptable for companies to ship oxygen and nitrogen more than 100 to 300 miles. (Flamm 316-17; Baker 448-49; Kimerling 882-83; Giordano 1928, 2019-20; Kridl 2180) Argon can be shipped somewhat longer distances (Flamm 320-21; Giordano 1928), but carbon dioxide is normally shipped shorter distances (Giordano 1928; see Flamm 338). Hydrogen can be marketed within 200 to 600 miles of the producing plant. (Kimerling 882-83; Giordano 2007) Helium, since it is not commercially available in many parts of the world, is shipped greater distances than are other industrial gases. (Giordano 1928)

184. Because most industrial gases cannot be shipped very far, customers can turn for supply only to companies with relatively nearby production facilities. Thus, a number of witnesses testified that shortages and excesses of supply have existed simultaneously in different parts of the country. Mr. Flamm referred to shortages in "pockets" of the country but said that

excesses have existed in areas of the country connected with the aerospace industry, such as California, Florida and Alabama (Flamm 240, 323); Mr. Cunningham testified that supply became tight in various individual markets (Cunningham 924-25); Dr. Kridl testified that supply and demand for industrial gases vary regionally (Kridl 2226). Mr. Giordano testified that today in most markets the supply-demand situation is relatively close, but in some areas there are shortages and elsewhere great excess of supply. (Giordano 1942)

185. This simultaneous regional existence of equilibrium, shortage, and over-supply indicates, as Mr. Giordano testified, that:

> "The business is essentially a regional one. As I testified yesterday, the product cannot be moved profitably or economically beyond, say, 200 or 250 miles from the plant. Consequently, a large excess in, say, New Orleans, of oxygen really has no impact on the shortage of oxygen in Boston." (Giordano 2019-20)

(5)

Was BOC a Perceived Potential Entrant Exerting a Pro-competitive Effect from the Fringe of the Market?

A. Was BOC Perceived to Be a Probable Entrant?

186. In an effort to establish that the United States industrial gas companies perceived BOC to be a likely entrant into the United States industrial gas business, complaint counsel called a series of industry witnesses. The testimony of those witnesses was far from unequivocal.

187. The witness most favorable to complaint counsel's position was Mr. Sol Kimerling, president of Alabama Oxygen, who said (876): "I would consider that at some point in time that they probably would have an interest in coming into the United States market." Mr. Kimerling said, however, that whether it would be next year, in five years or ten years would depend on "the right opportunity" (Kimerling 878-79).

188. Witnesses from Union Carbide and Air Products, the two largest United States industrial gases companies and the only domestic firms that compete with BOC abroad (Smith 1728-29), testified with even less certainty. In response to the question what companies he considered "to have the capital resources, marketing expertise, [and] technical expertise ... needed to enter into the production and distribution of industrial gases in the United

States," Mr. Flamm of Union Carbide responded (248-51):

> "In descending order of, I believe, demonstrated competency would be the British Oxygen Company, Ltd., either one or both of the two prominent German companies, Messer and German Linde, and, third, I would put a Swedish-based company, AGA. Now there are other companies with technical and financial resources, I believe, around the world, but they have never shown to date any inclination to expand offshore, off their home territory and these to a large extent are housed in Japan."

189. Mr. Flamm did not testify that he thought that entry into the United States by BOC was reasonably likely. Nor did he testify with respect to the probable costs of entry, either de novo or by acquisition, the likely return on any such investment or the advisability of entry for BOC or any other foreign company as a matter of business judgment.

190. The testimony of Mr. Baker of Air Products was in the same vein. He testified that in 1973 he believed that BOC, Messer Griesheim A.G., and Linde A.G. had "the capital and technical and marketing expertise to enter on a broad line the United States field or market for the production and marketing of industrial gases." (Baker 390) He said that he thought BOC was more likely than the other two firms to enter. (Baker 393) But Mr. Baker, like Mr. Flamm, never said that he expected BOC to enter, that he thought entry reasonably likely, that it would have been attractive as compared with BOC's alternative opportunities, or that he would have regarded entry by BOC as a prudent business

decision. He said no more than that he thought BOC, Messer, and Linde A.G. would have considered the possibility (Baker 392).

191. Still more equivocal was the testimony of Mr. Loveman, president of Burdett of Cleveland. Mr. Loveman first was asked whether he had thought that BOC might enter the industrial gas market in the United States. He responded bluntly: "Not until I read the papers." (Loveman 593) After a hastily requested recess and a conference with his lawyer concerning his testimony, Mr. Loveman changed his mind and said that "over the next five years, I would expect that they would in some connection." (Loveman 594-96) Mr. Loveman testified also that he had met Mr. Dow of Canox (BOC's Canadian subsidiary) in October 1973 and Mr. Dow then said he "thought Canox might like to become involved in the industrial gas business in the United States within the next five years". (Loveman 591-92) Mr. Dow denies having voiced any such "thought". (Dow 2046) And it does seem unlikely that he did, for Mr. Loveman testified that the purpose of the meeting was an exchange of information concerning the operating methods of Canox and Burdett, and subsequently there were reciprocal visits by Canox and Burdett personnel. (Loveman 605) Mr. Loveman said that he would not have exchanged business information if he had viewed Canox "as an actual competitor or soon to be prospective competitor." (Loveman 606)

192. Other industry witnesses called by complaint counsel were straightforward with respect to their expectations concerning BOC.

193. Mr. Cunningham, president of Chemetron's industrial gases division, testified (941-42):

"Q ... in recent years have you expected British Oxygen Company to enter the United States in the industrial gases field?

"A No, I have not.

"Q Do you think that British Oxygen or any other foreign company could enter the industrial gases field in the United States?

"A I don't believe so."

Mr. Cunningham went on to testify that he regarded entry by acquisition of small independent producers as impossible because "there just aren't that many independents around." (Cunningham 942) He testified that a de novo entry by obtaining tonnage contracts and then expanding into the merchant market was not feasible because "those pipeline contractors are usually very extremely competitive, and in my opinion it would be extremely difficult for anybody outside the United States to come into this market." (Cunningham 942)

194. Mr. Dempster, president of Liquid Air, testified that, while he thought BOC had the ability to enter the United States gases business, he never regarded the possibility of entry as a threat. (Dempster 567)

195. Finally, Mr. Giordano of Airco testified that he never anticipated that BOC would enter the United States gases business. (Giordano 1958-59)

196. No documentary evidence was offered to establish that any firm regarded entry by BOC as likely or possible. Mr. Flamm testified that he had never written any document reflecting the possibility that BOC might enter the United States market. (Flamm 335-36) Moreover, a May 1973 speech by the planning coordinator of Air Products listed the seven leading firms in the industrial gas industry and stated:

> "Although there may be shifts in relative rank, the same companies should continue to dominate the U.S. production of oxygen and nitrogen for the foreseeable future." (BOC RX 260-F)

197. Thus, complaint counsel failed to prove that BOC was perceived by any significant segment of the industry as reasonably likely to enter the United States industrial gases business by any means within the foreseeable future. The top executives of the third, fourth and fifth largest industrial gases companies testified that they did not think entry by BOC was likely. While executives of Union Carbide and Air Products, the two largest companies, testified that they thought BOC was able to enter into the industry -- which has never been disputed by BOC -- and even that they thought BOC more likely to enter than any other foreign company, they did not claim to have regarded that possibility as a reasonable likelihood. The gas company executive who stated that he thought BOC "probably would have an interest in coming into the United States" was the president of Alabama Oxygen -- whose company accounted for less than one-half of one percent of the value of shipments of industrial

gases reported to the Bureau of the Census for 1972.

198. This does not add up to any general expectation or perception. It is noteworthy that three industry witnesses called by complaint counsel -- Messrs. Perkins, Heckel and Hines -- were not even asked whether they thought BOC was likely to enter.

199. This lack of proof is not surprising on this record, since it is difficult to see how, to use the words of Falstaff,[1/] "it would appear to rational [industry executives] . . . that [BOC] might well" enter the United States. Previous findings indicate some major difficulties inherent in entering the United States gases market and others will soon be discussed -- the cost and risks of de novo entry, the scarcity of sound independent producers susceptible of acquisition and expansion, the difficulties of providing backup, the problem presented by the need to build relatively large plants in order to produce at a competitive cost, the poor returns generated by firms already in the business and the constant risk of backintegration by the larger companies. See Proposed Findings 131-141, 151-52, 248-[illegible]. Hence, there is here not only a failure to prove that significant industry executives regarded entry by BOC as reasonably probable, but the record contains objective economic facts indicating that such a belief could not have been well founded.

1/ United States v. Falstaff Brewing Corp., 410 U.S. 526, 533 (1973)

B. Did BOC Exert a Pro-competitive Effect from the Fringe of the Market?

1. Testimony of Industry Witnesses

200. Complaint counsel's failure to prove that BOC was perceived as reasonably likely to enter the United States industrial gases business precludes the possibility that BOC could have exerted a pro-competitive effect from the fringe of the market. As complaint counsel argued at the hearing -- in a successful attempt to exclude evidence -- a possibility of entry by BOC could not have affected competitive behavior in the United States unless the United States companies perceived that possibility. (944)

201. This logic is confirmed by the record: the evidence demonstrates that the possibility of entry by BOC never affected any business decision made by any industry witness.

Mr. Flamm of Union Carbide testified (336-37):

"Q You were for the last couple of years making constant decisions relating to price increases or decreases in industrial gases; is that right?

"A Yes.

"Q Have you ever made such decision in whole or in part because of the possibility that BOC might or might not enter the United States air separation field?

"A You flatter me on my sophistication as to how that decision would enter my pricing decisions which are one year or one-half year type decisions. No, it was a degree of sophistication that did not enter our considerations.

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"Q You never thought about it in considering prices; is that right?

"A That is right.

"Q Now, decisions were also made by you and your company in this time relating to the construction of new production capacity; is that right?

"A Yes, sir.

"Q In making any such decision, was your judgment in the slightest degree affected by the possibility that BOC might enter the American air separation field?

"A No, sir.

"Q In your dealings with distributors for the last couple of years has your conduct in the slightest been affected by the possibility that BOC might enter the air separation field in the United States?

"A No, sir."

Mr. Dempster of Liquid Air testified (567-68):

"Q During the years in which you have known of the capability of British Oxygen, Messer, Linde of Germany and other American companies to embark on the production and sale of industrial gas in the United States, you have made the decision to raise or lower prices for Liquid Air?

"A Not in that regard at all, because there was never any threat at any point.

* * *

"Q So the possibility of entry by another firm to the U.S. gases business has never affected any pricing decision which you made on behalf of Liquid Air?

"A No, it has not affected it.

"Q The same would be true, would it not, for the decisions on the construction or decision not to construct additional capacity, would it not?

"A That is correct.

"Q The same would be true about marketing decisions within the United States generally, is that right?

"A That's right.

"Q The same would be true about decisions that you made regarding research and development decisions of Liquid Air, is that right?

"A That's right."

Mr. Giordano of Airco testified (1958):

"Q ... Did you ever make a pricing decision, a manufacturing decision, or a marketing decision or a decision about research and development which was influenced at all by the possibility that British Oxygen might enter the gases business in the United States?

"A No."

202. Mr. Kimerling of Alabama Oxygen, the only witness who went so far as to testify that he thought BOC "probably would have an interest in coming into the United States" (876) -- in a year or five or ten (878-89) -- testified (881-82):

"Q Now, the possibility that Canox or BOC might enter the American market has never caused you to raise or lower any of your prices?

"A I have enough problems at home.

"Q And the same is true about any decision that you made, none of them have been affected by BOC or Canox?

"A Correct."

And Mr. Baker of Air Products testified (446):

"Q In any event, there were the three gas companies, BOC, Messer Greisheim and Linde that were studying the possibilities and you had all of this in mind. Now, the question I want to put to you is this: did any of the awareness that you had in your mind at any time in recent years affect any decision you made about pricing your products in the American [market]?

"A In the United States?

"Q Yes, sir.

"A No, I can't honestly say that our United States marketing decisions as to price were in any way affected by these possible entrants."

2. Was BOC the Most Likely Entrant?

203. Another factor tending to show that BOC did not exert any pro-competitive effect on the industrial gas industry from the "fringe" of the market is the existence of numerous firms equally or more capable of entering, and at least some of which were more likely to enter than BOC.

(a) Tonnage Users

204. From what has been said already, it is clear that tonnage users already back-integrated and the many tonnage users capable of back-integrating are all fully capable of entering the industrial gas industry. They have their own internal demand as a base from which to expand. As we have seen, all concededly have the technological know-how and the financial resources necessary and could obtain whatever marketing skills might be needed.

205. The fact that many tonnage users are already back-integrated is of great significance in connection with the problem of backup. Mr. Giordano, for example, testified that firms such as U.S. Steel -- which today operates four air separation plants -- would have advantages over BOC in entering the industrial gas industry because they could provide backup from their existing production facilities and, as major consumers of industrial gas, would have leverage likely to enable them to obtain backup supplies from competing industrial gas companies. (Giordano 1960-61)

206. Finally, a number of these firms have studied the feasibility of entering the industry, thereby demonstrating their interest in that possibility.

207. In addition to the tonnage users, there are at least three significant foreign industrial gas producers other than BOC that are capable of entering the United States industrial gas industry and likely to be interested in doing so: Messer Griesheim, Linde A.G. and AGA.

(b) Messer Griesheim

208. Messer Griesheim is a substantial German industrial gas company which operates in various parts of the world. (Baker 2747-48) It is undisputed that Messer has the financial resources, technical capability and marketing expertise necessary to enter the United States industrial gas industry. (Flamm 248-52; Baker 386-90;

Dempster 561-62; 564; Muller 718-20; Smith 1760-61; Giordano 1950)

209. In three respects, Messer would have advantages in entering the United States not possessed by BOC. First, it is a subsidiary of Farbewerke Hoechst A.G., a German chemical firm with sales of three to four billion dollars per year. (Kridl 2217; Muller 721-22) Thus, it has access to far greater financial resources than BOC. (Smith 1762-63; Muller 721-22) In addition, Messer has sold air separation plants in the United States, unlike BOC (Giordano 1926-27), and so it can reasonably be expected to have greater acceptance with tonnage users than BOC, an important factor in making tonnage deals. Finally, the Hoechst firm has an American subsidiary -- American Hoechst -- that is a significant factor in the United States synthetic fibers business. (Kridl 2217) This could provide Messer Griesheim with a welcome into the American business world not to be expected by BOC.

(c) Linde A.G.

210. Linde A.G. is another international industrial gas company based in Germany -- not connected with the Linde division of Union Carbide (Baker 2747-48; Smith 1760). It, too, had the financial resources, and technical and marketing expertise to enter the United States. (Flamm 248-52; Baker 386-90, 445-46; Dempster 561, 564; Muller 718-20; Smith 1760-61; Giordano 1950)

211. Linde A.G. would also have a significant advantage over BOC in entering the United States industrial gas industry: for many years it has been actively engaged in building air separation plants in this country (Smith 1762-63). It has a United States subsidiary, Lotepro, engaged in that business with a New York office and staff. (Flamm 297-98; Giordano 1927) Thus, Linde A.G. is both "on the ground" already and has considerable familiarity with and access to the United States gases business.

212. Linde A.G. has evidenced interest in the United States gases industry: it has conducted discussions regarding a possible acquisition or joint venture with Burdett of Norristown. (Perkins 811)

(d) AGA

213. AGA is an international industrial gases company based in Sweden. Like Messer Griesheim and Linde A.G., AGA has undisputed capability to enter the business in the United States. (Flamm 248-52; Smith 1760-61; Giordano 1950; see Kimerling 879)

214. AGA has demonstrated interest. It today sells welding equipment in this country. (Kimerling 880) It has approached Burdett of Cleveland twice and Burdett of Norristown once with respect to possible acquisition. (Loveman 607-08; Perkins 810) [D 28]

[D 28 continued]

C. Conclusions

215. BOC did not exert a pro-competitive effect on the United States industrial gas industry from the "fringe" of the market. There is no proof that significant elements of the industry perceived BOC as reasonably likely to enter. Moreover, irrespective of the perceptions of the industrial gas companies, this record clearly demonstrates that the competitive actions taken by those companies -- including pricing, construction, research and development, and marketing decisions -- were not influenced by the possibility of entry by BOC, however likely or unlikely such entry may have been. Finally, as of December 1973 there were numerous potential entrants, some of which were more likely to enter than BOC or faced lower barriers to entry by virtue of their positions as major users of industrial gases.

(6)

Would BOC Have Entered the United States Industrial Gas Field but for Its Acquisition of an Interest in Airco?

216. BOC would not have entered the United States industrial gases field in the foreseeable future but for its acquisition of an interest in Airco. This conclusion is supported by an array of evidence including: (a) the testimony of BOC's top executives, (b) a number of authoritative BOC documents extending back in time more than five years before the Airco acquisition, and (c) considerable objective evidence demonstrating that entry into the United States industrial gases field would be exceedingly difficult and imprudent absent such special circumstances as persuaded BOC to acquire an interest in Airco.

A. Testimony of BOC Executives

217. The testimony of BOC's top executives was uniformly to the effect that BOC did not intend to enter the industrial gases field in the United States and that BOC would not have done so in the foreseeable future, but for the Airco transaction.

218. Leslie E. Smith, who was group managing director of BOC since the late 1960s and chairman of the board of directors since 1972 (Smith 1642), testified (1741-42, 1744):

> "Q . . . Had you not acquired a stock interest in Airco, would BOC have entered the American, United States, gases business in any way in the foreseeable future?
>
> [Colloquy Omitted]

> "JUDGE BARNES: You may answer, Mr. Smith. Do you recall the question?
>
> "THE WITNESS: Yes. I cannot conceive any circumstances whatsoever that would bring BOC into the American market in the foreseeable future, barring Airco."

219. Similarly, Peter Laister, a director of BOC since 1969 (Laister 2528, 2533), testified (2552-53):

> "Q After the Perham-Greenfield report was received and considered [February 1970] (and before the meeting)* which you had with merchant bankers which you have mentioned here today [regarding Airco in June 1973], did BOC have any intention whatever to enter the U.S. gases business either on a Greenfield [green field] basis or by acquisition?
>
> "A There was no intention. Quite the reverse. We were quite determine[d], we decided when we had read the Perham-Greenfield report, that we would not enter on such a basis."

220. BOC rejected both de novo entry and entry by acquisition of firms smaller than Airco.

221. Mr. Smith testified that de novo entry would be extraordinarily costly. He estimated that it would be likely to cost $240 million and to take ten years to produce a viable national competitor, by which he meant a market share in excess of 5%. (Smith 1835-36) He added that he could not "conceive the circumstances in which [he] would have persuaded [his] board to expend that amount of money and take that amount of time, and to have that deteriorating effect on [BOC's] return that they would have said yes." (Smith 1836-37) In addition, he

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* The word "not" does not appear in the original transcript but the witness testified that it was inadvertently omitted from the transcript.

regarded the necessity of providing "backup" -- alternate supplies of gas in the event of plant failures (see Proposed Findings 250-52, infra) -- as a significant barrier to entry. (Smith 1751-52)

222. Entry by acquisition of a firm smaller than Airco was viewed by Mr. Smith as subject to most of the same difficulties as de novo entry. He testified that the gases companies in the United States fall into three categories: national producers (Union Carbide, Air Products and Airco), small firms which are essentially distributors with minor production capacity, and regional or specialized producers falling between these two extremes in size (Big Three Industries, Liquid Carbonic Division of Houston Natural Gas, Chemetron and Burdett Oxygen Company of Cleveland). (Smith 1732-36)

223. Mr. Smith testified that BOC regarded entry into the distributor-small producer side of the market as unattractive and difficult. He estimated that the cost of building one of these firms into a viable national competitor would be much the same as de novo entry. (Smith 1837-38) Moreover, he regards them as essentially local businesses surviving by dint of highly personalized service and the sale of welding equipment, neither of which is an area in which BOC would be likely to do well. (Smith 1733-35, 1741)

224. The four specialized or geographically localized firms were also viewed as unfeasible or unattractive. With the exception of [illegible], Mr. Smith regarded their financial

performance in recent years as poor. (Smith 1735-36) In addition, the limited scope of these firms -- Big Three and Burdett operate principally in Texas and the midwest, respectively, while Liquid Carbonic and Chemetron specialize heavily in carbon dioxide -- means that the cost of expanding any of these firms into a viable national competitor across a broad range of industrial gases would be extremely high. (Smith 1838-40)

B. Contemporaneous BOC Documents

225. The testimony that BOC did not intend to enter the gases field in the United States is corroborated by internal documents written long before there was any prospect of litigation.

1. The Perham-Greenfield Report

226. In 1969 and early 1970, Allan Perham, chairman of the board of Canadian Oxygen Company Limited (BOC's Canadian subsidiary, known as Canox), and I. Greenfield, a member of BOC's London marketing research staff, were detailed by BOC to conduct an extensive study of the U.S. industrial gases business. The purpose of the study was two-fold:

> "(i) To [illegible] the present and likely future situation in the American market, and to draw therefrom any lessons and experience which might have application in BOC Group.
>
> "Subsequently,
>
> "(ii) To consider whether there are any identifiable opportunities in USA which BOC might wish to exploit at some future date." (BOC RX 181-C; accord, CX 47-A)

Perham and Greenfield conducted an extensive study of the United States [illegible]. Their survey included inter-

views with many participants in the gases business in this country, collection of large quantities of data, and visits to many American producers and distributors. (CX 44; CX 232)

228. The Perham-Greenfield report concluded that entry by BOC into the industrial gases business in the United States was not commercially feasible. The summary and conclusion states in pertinent part:

> "Industrial gases have become a commodity in the USA and as a result are sold essentially on price. The result is a depressed industry with supply schemes being taken just about the cost of capital. Facility charges, transport costs, demurrage and even basic price schedules are being sacrificed in an attempt to gain market share. The damage has been done and even with current attempts to increase prices these increases will hardly cope with inflation. There is a completely inadequate return on capital employed or on shareholders' equity. * * * Based on the BOC requirement of 15% pre tax return on capital employed there is today no case for entering the USA industrial gas market as a producer for either on-site supply or merchant requirements." (BOC RX 62-B) (emphasis added)

229. The Perham-Greenfield report was both authoritative and fully adopted by BOC's top management. The study was commissioned by the chairman's committee[1/] of BOC, a fact reflected by contemporaneous minutes of that body. (BOC RX 181-B/D) BOC's efforts to discover business opportunities in the United States prior to the commissioning of the Perham-Greenfield

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1/ The chairman's committee was a top-level unit of BOC, presided over by the chairman of the board of directors, that served as a screening body for the full board. (Smith 1702-03)

report were halted pending its outcome. (BOC RX 61; CX 246; CX 225; CX 47-A) The Perham-Greenfield report was presented to the chairman's committee of BOC, the BOC board of directors, and BOC International,[1/] where its conclusions were unanimously accepted. (Smith 1708)

230. Perham-Greenfield eliminated any possibility that BOC would have entered the United States gases business absent some unforeseeable opportunity such as Airco. As Mr. Smith testified (1710):

> "Q Now, I would like to ask you, please, sir, following the receipt of the Perham-Greenfield report, what did you do about the US gases field afterward?
>
> "A What we did was to continue to be very interested in what was going on in the American industrial gas market but what the Perham-Greenfield report told us was that it confirmed an existing belief which existed among all of the top management of the BOC Group was that there was no practical way of coming into the American market."

2. BOC's Budget and Priorities after the Perham-Greenfield Report

231. Following the completion of the Perham-Greenfield report, BOC adopted priorities and allocations of resources for its international development which conclusively demonstrate

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1/ BOC International, or BOCI, is an informal association consisting of BOC London executives and the top executives of its four largest overseas subsidiaries, the Australian, South African, Indian and Canadian companies. (Smith 1654)

that it had no intention of entering the United States gases business prior to the Airco tender offer.

232. In July 1970, acting on a paper prepared by Leslie Smith, the BOC board of directors adopted priorities of investment and a budget for the development of its business through 1973. Contemporaneous BOC board minutes record these priorities and funds allocated for BOC development:

[D 18]

[D 18 cont.] the cost of a single air separation unit is between $7 and $16 million. (Cunningham 944; Giordano 1939-40)

233. BOC's plans with respect to the United States did not change between the July 1970 directors' resolution and the commencement of the discussions with Airco in the middle of 1973. (Smith 1714; CX 78-A; see Laister 2621-A) Indeed, the record is clear that the priorities and amounts budgeted by the board in 1970 were carefully respected. CX 301 shows that the average capital employed by the BOC group in America, which includes Canada and South America (Laister 2548), increased from [D 19] to [D 20] pounds from 1969/70 through 1972/73. (CX 301-E; CX 301-K) Thus, BOC invested [D 21] pounds in America between 1969-70 and the commencement of the Airco discussions -- precisely the order of magnitude set in the July 1970 board resolution (BOC RX 67-A).

234. In 1973, before the Airco opportunity arose, BOC projected that by 1977/78 it would have average capital employed in the United States of only [D 22] pounds (CX 301-K) an increase of only [D 23] pounds, [D 24] over that employed in America immediately prior to the Airco tender offer. This figure is wholly inconsistent with any suggestion that BOC planned to enter the United States gases business in the foreseeable future.

235. Thus, the Perham-Greenfield report closed the door on the United States for BOC. It did it so effectively that when Mr. Giordano, president of Airco, first met with Mr. Smith to discuss the possibility of a closer association between Airco and BOC, Mr. Smith "reminded him that [BOC] had studied the American Gas and Equipment market . . . and had concluded that it had no attractions for" BOC. (CX 78-A)

3. Other Documents

236. In a paper presented at the 1968 BOC International meeting, Mr. Christopher Hesketh-Jones, now overseas managing director of BOC (Smith 1654), in discussing parameters defining BOC's ability to become increasingly international, stated:

> "The first statement of Group objectives, PLS/JMD/23 said: 'to move towards becoming a fully international company with special reference to technological achievement'. We are good at starting and building up to meet market demand at all levels of sophistication and industrial gas business. This is at present our main strength. It is one we can still exploit in any of the less developed parts of the world where we would not be too late on the ground, and even in parts at least of continental Europe. But we have not got much to exploit in North America, and Japan is doubtful. . . . We have no major latent talents waiting unexploited to take us surging into Japan, Europe or USA. . .." (BOC RX 57-B/C) (emphasis added)

237. Similarly, in a planning paper concerning the United States, which led in part to the Perham-Greenfield report,

BOC's planning department wrote:

> "The BOC Group's first phase of participation must be seen as something that can only hope to succeed in a small or specialised sector -- one that is changing fast so that there is opportunity for newcomers. It is unlikely that an effective strategy could be built around an objective of becoming a major American firm in any wide range of gases and welding products; although possibility of participation in limited sectors need not be excluded at this early stage of reviewing the problem. * * * Entry by direct venture, with virtually no existing base from which to build, is unlikely to be practicable." (BOC RX 60-B/C) (emphasis added)

4. BOC's Conduct after Perham-Greenfield

238. Complaint counsel point to two alleged incidents after the date of the Perham-Greenfield report to suggest that BOC actively sought to enter the United States gases business before it bought the Airco stock: alleged acquisition overtures regarding Gardner Cryogenics in 1970, and Burdett Oxygen Company of Cleveland in 1973. The proof does not bear out counsel's suggestion.

239. Dr. Albert Muller, a former consultant to BOC called by complaint counsel, testified that in May or June 1970 he and Allan Perham visited Carpenter Technology, the owner of Gardner Cryogenics, a United States firm engaged in the helium business both here and abroad. Dr. Muller testified that, during the course of the discussion, he and Mr. Perham inquired as to

whether the entire Gardner Cryogenics helium business, including its United States operations, were for sale. (Muller 672-80)

240. It is undisputed that nothing came of the discussions with Carpenter. Moreover, it is clear that BOC's interest was in Gardner's European helium distribution business, not its United States operations. Dr. Muller admitted that the purpose for the visit was to determine the accuracy of information that BOC had received indicating that Carpenter was going to sell off Gardner Cryogenics's European helium distribution business. (Muller 676)

241. Moreover, contemporaneous BOC documents demonstrate that BOC's instructions to Mr. Perham, under whose supervision Dr. Muller worked (CX 25-B; CX 29-A), were to make inquiries with respect to Gardner's European helium business -- no interest in the United States is suggested. (BOC RX 234) Hence, the Carpenter-Gardner Cryogenics episode in 1970 does not demonstrate any abandonment of the Perham-Greenfield conclusions.

242. The other evidence relied upon as suggesting that BOC was interested in entering the United States is the testimony of Mr. Loveman of Burdett of Cleveland to the effect that, on October 15, 1973, Ray Dow, president of Canox, in "a very, very

innocent type statement . . . which could have been just said in passing", said that "Canox might like to become involved in the industrial gas business in the United States within the next five years" and asked whether Burdett "would . . . consider becoming a unit of Canox or BOC." (Loveman 592)

243. Mr. Dow firmly denied making any such statements to Mr. Loveman. (Dow 2043-48) Mr. Dow clearly had no authority, either from Canox or BOC, to discuss the possible acquisition of Burdett. (Dow 2047; BOC RX 222, 223) Moreover, at the time of the meeting between Mr. Dow and Mr. Loveman, BOC's discussions with Airco were well under way and Mr. Dow was aware of the possibility that BOC would acquire an interest in Airco. (Dow 2047) Thus, it is most unlikely that Mr. Dow would have made the statement attributed to him by Mr. Loveman.

244. But there is really no need to resolve any conflict between Mr. Loveman and Mr. Dow. Even if Mr. Loveman possesses perfect recall, and remembers Mr. Dow's alleged remark with precise accuracy, so casual and unauthorized an inquiry will not ground a finding that BOC had abandoned a policy decision adopted and carried out at its highest levels.

245. Following the completion of the Perham-Greenfield report, BOC also specifically rejected one of the means of entry

suggested as feasible by complaint counsel. In 1971, Mr. Perkins of Burdett of Norristown suggested to BOC that it acquire his company and a group of other small producer-distributors including Alabama Oxygen. (Perkins 792-93; CX 254-A) BOC rejected that suggestion. (Perkins 811-14; CX 117)

C. Barriers to De Novo Entry

246. The complaint in this proceeding alleges that "[e]ntry barriers into the industrial gas industry are high." (Cpt. ¶ 23) As we have seen, that fact has been central to BOC's view that entry into the United States gases business was not feasible.

1. Cost

247. Mr. Smith's estimate that de novo entry producing a viable operation -- over 5% of national sales -- would be likely to cost $240 million is corroborated by the evidence in this record. Indeed, if one looks solely at the capital investment required to build a sufficient number of air separation plants to service a significant share of the market, the estimate appears conservative.

248. The cost of air separation units was placed at between $7 and $16 million, depending upon size. (Giordano 1939-40; Cunningham 944; CX 232-W) Airco operated nineteen air separation plants in 1973. (CX 293 G) Assuming a cost of

$11.5 million per air separation plant, duplication of Airco's air gas production facilities would have cost BOC $218.5 million. And this takes no account of the need for facilities to produce gases other than air separation gases,[1/] capital costs for distribution facilities, and start-up costs which would surely have been substantial. (Kridl 2204-10; BOC RX 58-Z-40/Z-62; Flamm 234; see Baker 372-74)

249. This high cost would be coupled with uncertainty as to whether there would be a return on such an enormous investment, and, if so, when such a return would be realized. Dr. Andrew Kridl, chairman of the Center for Chemical Industry Economic Studies at the Stanford Research Institute, testified that he would have recommended against entry by BOC into the United States gases field on a de novo basis for the following reasons (2204-05):

> "First of all, entering the U.S. industrial gas market on a green field basis is fraught with very considerable danger.
>
> "The biggest danger is an economic one.
>
> Specifically, supposing you want to enter the field, green field, in order to build any

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[1/] Airco also had 26 acetylene plants, two carbon dioxide plants, two hydrogen plants, five helium plants, one rare gas plant, and 19 on-site nitrogen plants. (RAX 7, pp. 4, 11)

kind of a reasonable size plant, you have to have some contracts in hand for the plant's output.

"In order to get these contracts without having a plant, in order to overcome the natural reluctance of clients not wishing to deal with somebody not having a plant on site, you have to offer them extremely favorable terms.

"Therefore, it is very doubtful whether the first plant could make money either originally or after a period of time.

"The worst part of it is that once you get into this business, it is very difficult to enter into this kind [of] business on a green field basis, it is damn near impossible to construct a cash flow curve which will show you at which point your losses are going to start turning around and become profit.

"This would be the principal reason. That because of the very strong competition in the United States, there was no way that you could calculate ahead of time, with any degree of accuracy as to when your losses might stop."

2. Backup

250. Another obstacle to entry into the gases business in the United States is the need for "backup" -- the supply of gas to major customers from alternative sources when the producer's supplying plant is out of service, either for scheduled maintenance or as a result of plant failure. (Giordano 1931-32; CX 335-Z)

251. A new entrant building one plant could not provide backup from its own facilities. It could not begin to do so until

it had at least two tonnage plants reasonably close to each other. Until that unpredictable day, a new entrant could obtain backup supply only from one of its competitors, i.e., an existing industrial gas producer -- who would hardly be anxious to assist a new entrant. (Smith 1751; see Giordano 1960-61, 2011) Hence, the new entrant would suffer a serious competitive disadvantage in seeking to obtain tonnage contracts. (Smith 1751; see Giordano 1960-61)

252. The need for backup has important ramifications for the merchant field as well. Mr. Smith of BOC testified (1837): "The key to the market lies in the tonnage plant." This is true both in the sense that most of the atmospheric gases shipped in the United States are tonnage gases[1/] and in the sense that the tonnage plants enjoy economies of scale having significant effects on the merchant market. (Smith 1744-49; Dow 2042, 2060; Kridl 2234, 2183-87; CX 232-H) These effects derive from the common practice in the industry of constructing tonnage plants with capacities greater than the requirements of their tonnage customers and selling the excess product in the merchant market in order to take advantage of the economies of scale in production. (Smith

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1/ Almost 82% of the oxygen and 63% of the nitrogen shipped in the United States in 1972 were shipped as tonnage gases. (BOC RX 198, BOC RX 194) Oxygen and nitrogen accounted for 58% of the total value of shipments of industrial gases reported to the Census Bureau in 1972. (BOC RX 53)

1744-49; Giordano 1917-18; Baker 393-94) These economies of scale represent a significant competitive advantage (Dow 2041-2042, 2060), and they are purely a function of the ability of the producer to enter the tonnage end of the business. Hence, the need to provide backup is a barrier to entry not only into the tonnage segment of the business, but into the merchant end in those parts of the country where tonnage plants with excess capacity exist or are likely to be constructed.

3. Long Term Contracts

253. Major tonnage supply contracts in the industrial gas industry typically are for terms of 15 years. (Baker 2739-40) Hence, it is not feasible to enter the tonnage end of the industry by soliciting existing customers of the firms in the business already. Moreover, although it appears theoretically possible to obtain tonnage supply contracts at the expiration of the typical 15-year term, this would appear to be unlikely because of the economic disadvantage involved in bidding against a supplier whose plant has been fully amortized. In any event, there is no evidence in this record to suggest that tonnage users change suppliers with any frequency.

254. A related problem exists with respect to the merchant field. To greater or lesser degree, gases companies use independent distributors in selling in the merchant field.

Proposed Finding 117. Typically these distributors deal with one gas producer and are under exclusive contracts of five years' duration. (Baker 2757). These existing contracts and the relationships they reflect would impede the development of a distributor organization for a new producer entrant.

4. Economies of Scale

255. Virtually every witness who testified on the subject stated that economies of scale in air separation make it necessary to build a plant with a capacity of at least 200 to 300 tons per day in order to produce competitively. (Flamm 320-21; Baker 385-86, 448-49) This inhibits entry into merchant-only production, for it is difficult in any reasonable span of time to find merchant customers for 200-300 tons. (Smith 1748-49; Giordano 1919-20) As a result, the construction of merchant-only plants is relatively infrequent -- the more usual technique is to construct a tonnage plant with excess capacity available for merchant sale. (Smith 1758-59; Giordano 1919-20; Baker 2740; see CX 232-W)

256. Merchant-only construction does occur, but the usual technique is that employed by Airco with its new plant at Selkirk, New York, and by Air Products in its expansion into Canada. Airco's new plant will serve the Albany, New York area. Prior to completion of the plant, Airco had already developed

customers for it by shipping product from plants in Bethlehem, Pa. and Acton, Mass. (Giordano 1936-38) Similarly, Air Products is expanding into Canada by shipping product from its United States plants near the Canadian border until it has developed sufficient demand to justify construction of a Canadian plant. (Baker 397-[illegible], 2711-13) This method would be unavailable to a de novo entrant.

D. Was Entry by Acquisition of a Firm Smaller than Airco Feasible and Economically Attractive?

1. The Smaller Firms in the Industry

(a) Chemetron

257. Chemetron is engaged in the manufacture and sale of chemicals, metal products, welding equipment, medical equipment, fire protection systems, and gases. (CX 39; Cunningham 916-17) In 1973 it had sales of $353.4 million and net earnings of $10.4 million. It had 4.1 million shares of common stock outstanding (BOC RX 39-R), traded on the New York Stock Exchange. On December 7, 1973 (the last trading day before the BOC tender offer for Airco stock), Chemetron closed at $14.125 per share, for an aggregate market value of $56.5 million. (Wall St. Journal, Dec. 10, 1973, at 30) Its price-earnings ratio was 5.7, based on 1973 earnings of $2.46 per share. (BOC RX 39-R)

258. Chemetron's performance over the years has been erratic. Its net earnings and earnings per share fluctuated considerably from 1963 through 1973. (BOC RX 38-H/I; BOC RX 39-S) In fact, its 1973 earnings per share of $2.46 are considerably lower than the average of its earnings from 1964 through 1969. (Ibid.) It has not paid a cash dividend since at least 1963. (Ibid.) While Chemetron is the fourth largest United States industrial gas company (Cunningham 922; CX 325), it is considerably

narrower, both in product range and geographic coverage, than Union Carbide, Air Products and Airco. It does not manufacture helium, nitrous oxide, cyclopropane, the fuel gases or the rare gases. (Cunningham 917, 923) It has no marketing operations in northern California, the Pacific northwest or Arizona and no significant marketing effort in New Mexico. (Cunningham 920, 922)

259. In November 1969, an investment banker acting on behalf of Chemetron approached BOC to determine whether BOC would be interested in acquiring Chemetron. (Smith 1819-20; Johnson 828; CX 225-A) Chemetron was attempting to defend itself against a possible take-over by Sun Chemical by finding another company willing to take a large minority interest in Chemetron. (CX 223-A; CX 225-A) BOC expressed some interest in discussing the matter, and a meeting was held in Chicago between a managing director of BOC, the investment banker, and several Chemetron executives. (CX 225-A) Chemetron management was unwilling to have BOC acquire more than a minority interest. (Johnson 835; CX 224) Shortly thereafter, BOC indicated that it was not interested in talking further. (Johnson 836; CX 226)

260. The discussions between BOC and Chemetron were wholly tentative. These were "no discussions on market share, the possibility of expanding Chemetron, and a hundred and one other exercises which [BOC] would have had to have gone through before [it] would have arrived at any proposal to acquire even a minority part in Chemetron." (Smith 1884, 1815; CX 221) BOC never reached the

point of seriously considering acquisition of Chemetron. (Smith 1815; CX 221) In fact, a questionnaire that BOC requested Chemetron to answer was never completed. (Smith 1817; CX 225-B)

261. BOC did not pursue the Chemetron matter for two reasons. First, BOC regarded entry into the United States gases field as too difficult and expensive.[1/] Second, BOC would not have been interested in a minority interest in Chemetron. (Smith 1883-84; Johnson 835-36; CX 224, CX 226, CX 223-B)

262. There were no acquisition discussions between BOC and Chemetron subsequent to the Perham-Greenfield report. (Smith 1872-74, 1883-84)

(b) Liquid Air, Inc.

263. Liquid Air, Inc. is the United States subsidiary of a holding company called Liquid Air Corporation of North America, which is in turn a subsidiary of L'Air Liquide, a French company which is the largest industrial gases company in the world. (CX 335-P; Flamm 262) Liquid Air Corporation of North America also owns Canadian Liquid Air (CX 335-P), which is the largest industrial gases company in Canada. (CX 335-P; Baker 2714)

1/ The importance of BOC's negative view of the United States gases business in the Chemetron context is corroborated by an internal memorandum from Leslie Smith to Allan Perham in which Mr. Smith expressed reluctance to terminate discussions with Chemetron pending completion of the Perham-Greenfield report. (CX 225-B)

264. Liquid Air is the product of a series of acquisitions by L'Air Liquide. In 1969 it acquired American Cryogenics, a west coast producer of industrial gases and welding equipment which had gases sales of $13.5 million and total sales of $20 million. (CX 335-P; Dempster 521, 526, 551) L'Air Liquide made the acquisition on very favorable terms: it paid nothing in cash, giving only $6 million in promissory notes, and preferred stock having an aggregate par value of $19 million -- stock in which there is no public trading and no established market value. (Dempster 559) At the time of the acquisition, L'Air Liquide estimated that the liquidation value of American Cryogenics, "the value of the business sold on the auction block", could not possibly be lower than $20 million, even "if worse came to worst". (Dempster 559)

265. Later in 1969, Liquid Air acquired Industrial Air Products ("IAP"), a leading gases producer in the Pacific northwest. (Dempster 528; Giordano 2031) IAP had sales of $18 million, of which $17.8 million was in industrial gases. (Dempster 529-30)

266. Thus, L'Air Liquide entered the United States industrial gases field in 1969 by acquiring two companies having total sales of $38 million and gases sales of over $21 million -- and at least one company was acquired for an all-paper price approximating its liquidation value. By the end of 1972, their gas sales had grown to but $26.2 million. (Dempster 547) The geographical scope of these companies had not been expanded significantly. (Dempster 528)

267. On December 31, 1972, Liquid Air acquired Gulf Oxygen of Lake Charles, La., and Dye Oxygen of Phoenix, Ariz. In 1972 each had sales of about $10 million; about $3 million of Gulf Oxygen's sales and $6 million of Dye Oxygen's were attributable to gases. (Dempster 529-30, 552)

268. Thus, the aggregate value of Liquid Air's shipments of industrial gases in 1972, including Gulf and Dye, was about $33.5 million. (Dempster 516)

269. Liquid Air has a limited scope in the industrial gases business, both in terms of its range of products and its area of operation. It produces primarily air separation gases, but no rare gases (xenon and krypton) and little carbon dioxide. (Dempster 513, 515, 569) Its operations are centered in the south, southwest and on the Pacific coast. It has no significant production or sales activity in "the heavily industrialized eastern and midwestern regions of the United States which ... [are] the largest markets for industrial gases." (CX 335-P; Dempster 544)

270. There is no evidence that Liquid Air has been available for acquisition at any time. It must be regarded as extremely unlikely that L'Air Liquide would be willing to sell its United States operation to BOC even if BOC were interested in acquiring it.

(c) Liquid Carbonic

271. Liquid Carbonic is a subsidiary of Houston Natural Gas Corporation which acquired it in early 1969 from General Dynamics as a result of a divestiture order entered in United States v. General Dynamics Corp., 258 F.Supp. 36 (S.D.N.Y. 1966) (See Flamm 224)

272. Liquid Carbonic is primarily in the carbon dioxide business. Today, as at the time of the General Dynamics decision, it is the largest producer of carbon dioxide in the United States. (Baker 2782; General Dynamics, supra, 258 F.Supp. at 39; CX 232-Z-24 CX 232-Z-4) At the time of General Dynamics, Liquid Carbonic accounted for 35% to 40% of shipments in the carbon dioxide market, supra, 258 F.Supp. at 39.

(d) Big Three

273. Big Three is a Texas-based company with 1973 sales of $118.9 million and earnings of $13.2 million. (BOC RX 31-C) It sells various equipment and services used in the petroleum industry, and manufactures and sells industrial gases and welding equipment. (BOC RX 31-D/G) Its sales of industrial gases in 1973 were $35.6 million, making it the seventh largest gases company in the United States. (BOC RX 31-D; CX 325) During 1973 it had approximately 5.3 million shares of common stock outstanding, traded on the New York Stock Exchange. (BOC RX 31-C) On December 7, 1973, Big Three common shares closed at $42.50 -- an aggregate market valuation of $225.3 million. (Wall St. Journal, Dec. 10, 1973, at 30) Big

Three's price-earnings ratio on that date was 16.9, based on earnings per share of $2.51. (BOC RX 31-C)

274. Big Three's industrial gases operations are wholly regional, being heavily focused in the Houston and Gulf Coast area. (Flamm 321; Cunningham 932-33; Smith 1735-36; Giordano 2031; CX 232-Z-2) All of the industry and expert witnesses were in agreement that Big Three is the leading industrial gases company in the Houston-Gulf area; Mr. Cunningham of Chemetron testified that Big Three's share of the Houston area market exceeds 50%. (Cunningham 932-33; see also CX 232-Z-2) Messrs. Smith and Giordano both regard Big Three as "dominant" in that area. (Smith 1735; Giordano 2032) Arthur D. Little, Inc. termed Big Three's position on the Gulf Coast "preemptive" as long ago as 1969. (CX 232-Z-3)

275. This market position is at least partially attributable to a heavy concentration of large consumers, principally chemical companies, in the Houston area which Big Three services by a pipeline network. (Kridl 2202-03; CX 232-Z-3; CX 232-A-42) Indeed, Big Three claims to have an oxygen and nitrogen pipeline system extending from Freeport, Texas, to Lake Charles, Louisiana -- "the most extensive industrial gas pipeline system in the United States". (BOC RX 31-I; see CX 232-O) This heavy reliance on pipeline distribution, which is quite inexpensive, makes Big Three's operations uniquely profitable. (Kridl 2202-03)

276. There is no evidence that Big Three was available for sale at the time BOC acquired Airco. In fact, such evidence as exists indicates that the management of Big Three would be opposed to any acquisition. (Kridl 2246)

(e) Burdett of Cleveland

277. Burdett of Cleveland is a regional gases producer doing business primarily in the midwest. (Loveman 580-81) It is engaged in the gases and medical equipment businesses. (Loveman 577) In fiscal 1973, Burdett of Cleveland had sales of $22.0 million, operating income of $125,000, and a tax benefit from use of an operating loss carry-forward of $119,000. (BOC RX 35-B) In fiscal 1973, Burdett of Cleveland had approximately 1.34 million shares of common stock outstanding (BOC RX 35-D), which were traded over-the-counter. On December 7, 1973, Burdett's common stock closed at $3.50 bid, $4.00 asked, resulting in an aggregate market valuation on the company of $4.7 million. Its price-earnings ratio was 32.7 before taking the operating loss carry-forward into account and 15.9 after.

278. Burdett of Cleveland is the eighth largest industrial gas company in the United States. (CX 325) It produces oxygen, nitrogen, argon, acetylene and hydrogen, and it purchases carbon dioxide and helium for resale. (Loveman 577-78) It has four tonnage-size air separation plants, which produced 40% of its total revenues in fiscal 1973. (BOC RX 35-F/J)

279. Burdett of Cleveland's performance and financial condition in recent years have not been good. The small profit earned in fiscal 1973 was the first for Burdett since 1969. (BOC RX 35-L/M) It lost money heavily during that period. (Ibid.) At the end of fiscal 1973, Burdett had accumulated a long-term debt of nearly $17 million as against a shareholders' equity of but $4 million. (BOC RX 35-L) The company's plant and inventory are pledged as collateral. (BOC RX 35-Q) Major creditors of Burdett of Cleveland hold substantial equity interests in the company. (BOX RX 35-D)

280. At least some of Burdett's financial problems are attributable to difficulties it has encountered with its tonnage operations. It built its first tonnage plant in the Joliet, Ill. area in 1968-69, and encountered substantial difficulties with the functioning of the plant as well as cost overruns. Mr. Loveman, president of Burdett, testified that these difficulties with the Joliet plant had "such a compounding effect that it affected our overall financial structure as to the viability of the company." (Loveman 584) In addition, because the Joliet plant came on stream late, the tonnage customer purchased backup supplies in the merchant market and Burdett was forced to reimburse it for the cost of the product. (Loveman 585; see Giordano 1954-55) Finally, the Joliet contract obligates Burdett to supply product at less than its cost of capital. (CX 232-Z-25)

281. BOC did not regard Burdett as an attractive acquisition possibility. In February 1970, Perham and Greenfield reported that they considered Burdett to be "very badly managed". (CX 232-E) In June, BOC rejected overtures from investment bankers seeking to promote its acquisition of Burdett. (CX 242, CX 243)

282. Several witnesses testified with respect to whether Burdett could be regarded as an attractive acquisition candidate. Dr. Muller, complaint counsel's witness, testified that it "certainly was not an attractive situation," and that he had recommended against entry by BOC in the U.S. gases market by means of a toehold acquisition. (Muller 684, 712)

283. Mr. Giordano testified that "there are some problems with [Burdett of Cleveland] that I believe have made it unattractive to any buyer, foreign or domestic," revolving around the tonnage contract at the Joliet plant. (Giordano 1954-55) Dr. Kridl testified that he would not have recommended that BOC attempt to enter the United States industrial gases business by acquisition of Burdett because "Burdett has over the years, been a financial disaster." (Kridl 2206)

284. Finally, in a 1968 study prepared for United States Steel Corporation on whether Steel should enter the gases business, Arthur D. Little, Inc. reported:

> "Another alternative open to U.S. Steel is the acquisition of an existing company. It is our conclusion, however, that only the 4 largest suppliers for this market [Union Carbide, Airco, Air Products and Chemetron] can be considered stable, effective suppliers with a significant market position. The other companies all suffer from various deficiencies which make their acquisition relatively unattractive when compared to the alternative of entering the business on your own." (BOC RX 58-N; Karnath 2079-70)

Later in the same report, ADL characterized Burdett as poor or poor-to-fair in virtually every aspect of its business, (BOC RX 58-Z-38) Significantly, the Little report was completed before Burdett's problem with Joliet arose.

(f) Alabama Oxygen Company

285. Alabama Oxygen is a small, company in the gases and building equipment businesses. (Kimerling 854)

286. Gases amount to about half of its business. In 1972, the total value of shipments of gases produced by Alabama Oxygen, f.o.b. plant, was said to be $1.7 million and the net sales of gases (including gases purchased and resold) was $2.6 million. (Kimerling 855-56)

287. Alabama Oxygen has very limited product range, geographical scope and production capacity. It produces only oxygen, nitrogen, hydrogen and acetylene. (Kimerling 856-57) The total capacity of its two air separation plants is 30-35 tons per day. (Kimerling 881) Almost all of its manufacturing facilities

are located in Bessemer, Ala., a suburb of Birmingham. (Kimerling 856) It sells in portions of Alabama, Mississippi and Tennessee, all within a radius of 200 to 300 miles of Bessemer. (Kimerling 856-67, 882-83)

288. While there is evidence that other firms have made efforts to acquire Alabama Oxygen, their efforts were unsuccessful (Kimerling 876-77) and there is no basis for concluding that Alabama Oxygen is available for acquisition on feasible terms.

(g) Burdett Oxygen Company (Norristown)

289. Burdett of Norristown, which has no connection with Burdett of Cleveland (Perkins 810), is a small acetylene producer located in Norristown, Pa. (Perkins 778, 781) In 1972, its total value of shipments of acetylene, f.o.b. plant, was said to be $250,000. (Perkins 806) Burdett markets within a 100-mile radius of its facility, selling its own acetylene and other gases which it buys from other producers. (Perkins 801-03, 781-82) Its total production capacity is three million cubic feet of acetylene per month. (Perkins 781-82)

290. Burdett of Norristown also owns 50% of the stock of Narox, which produces oxygen and nitrogen. (Perkins 779, 781) The Narox operation, the other 50% of which is owned by National Welders Supply Co. of Charlotte, North Carolina, has an air separation plant located at Hopewell, Virginia, which has a capacity of 200 tons per

day of pipeline nitrogen and 75 tons per day of liquid product, oxygen and nitrogen. (Perkins 779, 782) The pipeline nitrogen is sold to a single tonnage customer, Allied Chemical, and the liquid product is sold exclusively to Burdett of Norristown and National Welding Supply in equal shares. (Perkins 783) The total value of shipments in 1972 of the oxygen and nitrogen produced by Narox was said to be $850,000, f.o.b. plant. (Perkins 785-86)

291. Taking Burdett's own operations together with its share of the Narox production, its total production capacity is 3 million cubic feet of acetylene per month, 37.5 tons per day of liquid oxygen or nitrogen, and 100 tons per day of gaseous nitrogen which it is committed to supply to Allied Chemical.

292. There is no evidence in this record concerning the profitability, if any, of Burdett of Norristown.

293. Mr. C. D. L. Perkins, executive vice president of Burdett, testified that it was available for sale in 1973. (Perkins 788) No inquiry as to the desired terms of sale was permitted, but some light is shed on what Mr. Perkins means by "available" by his testimony that he does not know of any company that is not "available" for acquisition "for the right price." (Perkins 807)

294. The record demonstrates that BOC was not interested in acquiring Burdett of Norristown. In 1971, Mr. Perkins contacted BOC while he was in London on other business. He set up an

appointment with John Williams, a managing director of BOC, for the purpose of attempting to convince Mr. Williams that BOC should join a trade association of which Perkins was an officer. During the course of Perkins' interview with Williams, Perkins suggested on the spur of the moment that BOC consider acquiring Burdett and perhaps later on several other small companies as a vehicle for entering the United States market. BOC considered the possibility that Perkins had raised; it sent someone to Norristown to look at Perkins' operation. A short time later, BOC wrote Mr. Perkins and told him that it was not interested. (Perkins 811-14; CX 117)

295. Burdett of Norristown has also been approached by, and discussed acquisition with, several other companies, in and out of the industrial gases business. AGA, the Swedish gases producer, took a careful look at the Burdett operation. Discussions were had also with UGI, a Philadelphia public utility, and with Linde A.G., the major German gases and plant producer. Nothing came of any of those discussions. (Perkins 810-11)

(h) Northern Gases and Supply Co.

296. Northern Gases is a small family business engaged in distribution and some production of gases in Milwaukee, Wis. (Heckel 730, 746-48, 731-32)

297. Northern Gases' production capacity consists of two air separation plants which produce oxygen and nitrogen -- but no

argon -- and two acetylene plants. (Heckel 733-34, 748-49) Its total oxygen-nitrogen capacity is 105 tons per day; it has no pipeline supply arrangements or capabilities. (Heckel 733-34, 748-49) Northern Gases buys and resells oxygen, nitrogen, argon, carbon dioxide, helium, propane and nitrous oxide, which it buys from Air Products and Burdett of Cleveland. (Heckel 730, 744-45)

298. Northern Gases' entire operation is within a 35-mile radius in the metropolitan Milwaukee area. (Heckel 731-32, 748-49) In 1972, the total value of shipments of gases produced by it, f.o.b. plant, was said to be $1 million and its total sales of gases were $2 million. (Heckel 731-32) Mr. Heckel, who owns a 50% interest in the company, testified that his company was available for acquisition in November 1973. (Heckel 736, 746-48)

(i) Other Firms

299. In addition to the companies discussed above, there was testimony to the effect that other small firms are engaged in the production and sale of one or more of the gases involved here. (E.g., Flamm 285-86, 286-87; Loveman 601-03; Baker 364-66; Kimerling 861-63, 886-89, 857-58) None of these firms, however, has gases sales of more than $5 million. (Smith 1737; Kridl 2244; Dempster 553-54) Moreover, there is no evidence regarding their availability for acquisition, the possible terms of any such acquisition, or the financial performance of any of these companies.

2. Entry by Acquisition and Development of Small Firms

(a) Availability

300. The record here leaves considerable doubt concerning the availability for acquisition of small gas-producing firms. While evidence established that there is a number of small producers with gases sales of less than $5 million per year (e.g., Flamm 225-26; Baker 364-66; Kimerling 861-63, 857-58, 886-89; Dempster 553-54; Smith 1737; Kridl 2244), complaint counsel sought to adduce evidence concerning the availability of but three: Northern Gases and Supply Co., Burdett of Norristown and Alabama Oxygen. As to these three firms, the evidence of availability is equivocal.

301. Although Mr. Perkins of Burdett of Norristown testified that his firm is available for acquisition, there is no evidence as to whether the asking price bears any reasonable relationship to the earnings or value of the company. Burdett of Norristown has had fruitless acquisition discussions with a series of companies in recent years, suggesting either that Burdett was not available on reasonable terms or was not regarded as attractive. Moreover, Mr. Perkins' concept of availability was demonstrated by his testimony that he did not know of any company that was not "available" at the right price. (Perkins 807)

302. The evidence concerning the availability of Alabama Oxygen is weaker than that relating to Burdett of Norristown. Mr. Kimerling was not asked whether his firm was available or on what terms. He testified only that several firms had made unsuccessful efforts to acquire Alabama Oxygen. (Kimerling 876-77)

303. The situation as to Northern Gases is similar. (Heckel 735-36)

(b) Cost of Development

304. There is no evidence as to what it would cost to acquire a small industrial gases producer. The record does, however, provide a basis for estimating the cost of developing such a small producer into a viable national competitor.

305. Mr. Smith testified without contradiction that virtually the same costs would be incurred in acquiring a small company and then expanding it into a nation-wide competitor comparable to Airco. (Smith 1835-40) In view of the facts that these small companies are one- or two-plant operations, that the plants are far below the 200 to 300 ton size necessary for economic operation, and that they are confined to tiny geographical areas, his appraisal that building up such a company would be essentially the same as a de novo entry is reasonable. It is borne out by Mr. Giordano (1957):

> "There would be no point ... for a foreign company to come in and buy a small industrial gas company that is in one little regional market and add a 25 to 50 ton per day plant. That is a de novo entry into the market. There is little difference between the cost of entry ...."

(c) Backup

306. The need for backup, like high entry costs, is also a significant barrier to entry by acquisition of firms smaller than Airco. Firms with small or geographically concentrated production facilities -- features of all of the firms smaller than Airco -- would be unable to provide backup for their existing operations or for operations in new areas. Indeed, small producers testified that they or their tonnage customers were forced to obtain backup from major producers. (Heckel 744-45; see Loveman 585) The problem would not be solved by acquiring a group of small producers, because the existing firms are spread out and could not economically provide backup to each other due to transportation costs. (See Perkins 800-01; Giordano 2030-32) Thus, entry by acquisition of one or more small firms would, as Mr. Smith testified, leave BOC at the mercy of its competitors for backup supplies of product. (Smith 1751)

(d) Economies of Scale

307. While it is plain that acquisition of a small producer with a small plant would not permit the acquiring company to take advantage of the economies of scale inherent in operation of

a larger plant, the same would be true for acquisition of a group of these small producers. These small companies are widely separated geographically. (Giordano 2020, 2040-42) For example, Northern Gases is in Milwaukee, Wis., Burdett of Norristown is in Norristown, Pa., and Alabama Oxygen is in Bessemer, Ala. The great distances between these small firms' marketing areas make consolidation of production into a single economically-sized plant and shipment of the product into their local markets wholly unfeasible. (Perkins 800-01; Giordano 2030-32)

3. Entry by Acquisition and Development of Intermediate-Sized Firms

308. Mr. Smith classified four firms -- Chemetron, Liquid Carbonic, Big Three and Burdett of Cleveland -- as lying between the broad range, national competitors -- Union Carbide, Air Products and Airco -- and the small distributor-producers. (Smith 1735-36) In view of its recent acquisition of Gulf Oxygen and Dye Oxygen, Liquid Air may be added to this list. Acquisition and development of any of these firms, however, does not appear to be a reasonable means for entry.

(a) Availability

309. To begin, there is no basis for concluding that any of these firms would be available were BOC interested in such an acquisition. Liquid Air is a subsidiary of L'Air Liquide, the

world's largest industrial gas producer. Liquid Carbonic is a subsidiary of Houston Natural Gas Corp. Chemetron's management has already evidenced its opposition to acquisition of a controlling interest by BOC. Big Three may surely be expected to take a similar position. (Smith 1877-78; Kridl 2246) Finally, Mr. Loveman of Burdett of Cleveland testified that he is not now interested in selling his company. (Loveman 592)

(b) Cost of Acquisition

310. Putting aside any unwillingness of the managements of Big Three, Chemetron and Burdett of Cleveland, the three publicly-traded companies, to support an acquisition by BOC, the costs of such acquisitions would present serious problems.

311. For example, Big Three's price-earnings ratio of 16.9 would make acquisition of that company by BOC -- with a ratio of six or seven -- costly and unattractive. (Kridl 2208-09)

312. Assuming such an acquisition were to be made by means of an exchange of BOC stock for Big Three stock, the effect of Big Three's high price-earnings ratio would be a substantial dilution of BOC's earnings per share, with a consequent adverse impact on the price of BOC shares. (Kridl 2251)

313. A purchase of Big Three stock or assets for cash would also have undesirable financial consequences. The fact that the purchase would be a taxable transaction for Big Three

shareholders would necessitate the payment of a substantial premium over the market price of Big Three stock in order to induce shareholders to sell. This premium would result in a considerable amount of good-will on the BOC balance sheet which would have to be written off against post-tax earnings, thereby causing a similar adverse impact on BOC's earnings per share and stock price. (Kridl 2252-53)

314. When the high price of Big Three stock is coupled with the need to pay a premium in a cash transaction, it is apparent that BOC could not have acquired a substantial interest in Big Three for the $80 million it invested in Airco. As we have noted, Big Three stock closed at $42.50 immediately prior to BOC's tender offer for Airco's stock. The amount of the premium which would have been necessary may be estimated from the fact that Airco stock closed at $12.875 just prior to the announcement of the Curtiss-Wright and BOC tender offers. (CX 125-Z-14) Thus, BOC's offer of $20 included a premium of 55% over the market value of Airco's stock. Assuming the same premium, Big Three stock would have commanded roughly $66 per share in December 1973. The $80 million that BOC paid for a 35% interest in Airco would have purchased only 1.21 million shares of Big Three at that price, or a 23% interest. Moreover, given Big Three's 1973 earnings per share of $2.51, BOC would be able to consolidate only $3 million of earnings on an $80 million investment (2.5 million shares, earning $2.51 each) as compared with the $6.6 million of earnings it can consolidate having acquired an interest in Airco (4 million shares, earning $1.66 each).

(c) Cost of Expansion and Other Barriers to Development

315. Acquisition of one of these intermediate sized firms would not have been the equivalent of an acquisition of Airco because, as Mr. Smith testified, all of these firms are specialized either in product or in a particular geographical area. Broadening their product or geographic scope to a point sufficient to make them nation-wide competitors across a line of products as broad as Airco's would involve additional heavy investment, in both plant and distribution facilities. (Smith 1838-40) Moreover, such expansion would involve many of the same barriers that would face a de novo entrant. (Smith 1832-38)

E. Would BOC Have Entered the United States from Canada?

316. Complaint counsel have suggested that BOC would have entered the United States industrial gases business via its Canadian subsidiary, Canox. That suggestion was repeatedly denied by BOC and Canox executives. BOC chairman Leslie Smith testified:

"Q ... Had you not acquired an interest in Airco, would you have considered invading the American gases field from Canada?

"A No.

"Q Please explain why not.

"A The Canadian company is a comparably [comparatively] small company. It is number three in the Canadian market. And essentially it is a distributor. Its biggest plant is a tiny plant.

> It's very small indeed so far as its productability is concerned. Now, the production costs from that plant are hopelessly uncompetitive when compared with the cost of producing oxygen from a large-scale tonnage plant, such as available in most industrial areas close to the Canadian border. There is no way in which the Canadian product can compete, particularly when you take into account the cost of freighting it from the point of production. Canada is primarily a distribution company, of which there are many examples in the States. And there is no way in which they could, on a competitive basis, invade the American market, in quote marks." (Smith, 1759-60; accord, Laister, 2558-60, 2660-61, 665, 2670-73; Dow 2042)

317. Again, BOC's internal documents support the testimony of its executives. In August 1969, shortly before the Perham-Greenfield study was commissioned by the BOC board, BOC's planning section prepared a discussion paper on the United States which contained a section entitled "Canada as a Base?" The section concluded that "while Canox has an important and valuable place as base for the BOC Group in North America, its existence and its future development cannot be seen as substitute for Group business development policies for the USA." (CX 38-G) Mr. Perham, chairman of the Canox board, commented on the paper:

> "I certainly agree with you that Canada is not a base for penetration of the USA market. The best it can do is provide a home for the period in which we are conducting our search." (CX 37-A)

318. The facts concerning Canox show that BOC could never have contemplated entering the United States gases business from Canada. Canox's total sales of gases in 1973 were about $8 million. (Dow 2042) It sells the air separation gases, acetylene, propane, nitrous oxide, cyclopropane, carbon dioxide, and small amounts of hydrogen and helium. (Dow 2037-38) The only gases which Canox manufactures are oxygen, nitrogen and acetylene -- it purchases the balance. It has only one air separation plant, with a daily capacity of 20 tons. (Dow 2038) That plant serves only the immediate Toronto area; the air separation gases which Canox sells in other parts of Canada are all purchased from Canox's competitors. (Dow 2038-40) In fact, Canox buys more gas than it produces. (Dow 2041)

319. Canox has no tonnage production facilities. (Dow 2041-42) The inefficiency of its current production facility is demonstrated by the fact that Canox's production cost for air separation gases is 13¢ per 100 cubic feet while it buys the same gases from its competitor, Canadian Liquid Air, at 9¢ per 100 cubic feet. (Dow 2042) Canox's business is not large enough to justify construction of a more efficient plant. (Dow 2041-42)

320. In addition to the fact that Canox cannot produce gas at a competitive price, it suffers from location disadvantages which would make it economically unusable as a base for entry into the United States. The Canadian Liquid Air plant from which Canox

buys oxygen and nitrogen at 9¢ per cubic foot is the world's largest air separation plant, with a capacity of 2100 tons per day. It is located at Hamilton, Ontario, 30 miles closer to the United States via the shortest road link than Canox's Toronto plant. (Dow 2041-42) Thus, if Canox were to decide to ship gases into the United States, it would not only suffer a substantial production cost disadvantage, but a freight disadvantage as well.

321. The only evidence which was offered in support of complaint counsel's thesis was to the effect that Canox had expressed interest in purchasing the tonnage air separation plant in Niagara Falls, N.Y., owned by Burdett of Cleveland. There surely was an interest -- but not in terms of the United States. The BOC and Canox witnesses explained that they would have been interested in acquiring the Burdett plant to obtain oxygen and nitrogen for the Canadian market, where Canox does not produce enough for its own needs. (Dow 2043-44, 2049-50, 2058-59; Smith 1826-28, 1849-50, 1878-80, 1889-90; Laister 2661-65)

322. The foregoing demonstrates that the entry-via-Canox hypothesis advanced by complaint counsel is really a false issue. Canox is patently in no position to enter the United States from its existing facilities. Any entry would require the construction or acquisition of new production and distribution facilities in the United States. The existence of Canox's 20 ton plant in Toronto simply has no bearing on the probability that BOC would or

would not have entered, which is an issue that must be considered on its own merits.

F. Airco Was a Unique Opportunity for BOC

323. BOC's acquisition of an interest in Airco does not contradict its testimony that it had no intention of entering the industrial gases business in the United States in the foreseeable future. To begin, the sequence of events leading up to BOC's tender offer is fully consistent with its having regretfully concluded that entry into the United States was not feasible. Moreover, as Peter Laister of BOC testified, this acquisition "was a unique opportunity" for BOC in many respects. (Laister 2557)

324. In considering the implications of BOC's acquisition of an interest in Airco, it is essential to bear in mind that it was Airco that initiated the discussions (Giordano 2033; Laister 2626), and that BOC would not have tendered for Airco stock against the wishes of Airco management (Smith 1658; Laister 2557). BOC was not seeking an acquisition in the United States gases business when it was approached by Airco (Laister 2626) and had not done so at any time after the Perham-Greenfield report (Smith 1714-15).

325. The acquisition at issue here had its origins in a visit that David Craig, president of Airco Industrial Gas Division, paid to Mr. Laister of BOC on June 9, or 10, 1973. The Craigs and

the Laisters had been friends for some years. (Laister 2537) Mr. Craig was in London and a visit to Mr. Laister's home was arranged. (Laister 2538)

326. Coincidentally, on that very day, Mr. Laister was visited by a group of investment bankers who pointed out that the American stock market had reached a low ebb, producing some interesting opportunities. (Laister 2540) In particular, the bankers told Mr. Laister that Airco stock was extremely low and that a tender offer was about to be made (Laister 2540-41).

327. When Mr. Laister and Mr. Craig met later that day, they spoke in indirect terms about the possible tender offer, focusing on the price of Airco stock and whether Airco felt vulnerable to a takeover bid. (Laister 2542-43)

328. At the same time, BOC began a study of the implications for BOC of a tender offer for Airco by someone else -- a hostile tender offer might make Airco management receptive to an offer from BOC (Laister 2542).[1/]

329. At the time these events were taking place, Airco management had heard rumors concerning the possibility that a tender offer would be made for Airco stock, which was then selling at its lowest price in years -- less than one-half its book value.

1/ CX 72, 73, 75-77 and 79 are studies BOC made of Airco in this period. (Laister 2544-46)

(Dillon 2585-87) Airco's management felt vulnerable to a hostile takeover bid and was looking for options. (Giordano 2033-34; Dillon 2586-87) Consequently, shortly after the Craig-Laister meeting, Mr. Giordano telephoned Mr. Smith and suggested a meeting to discuss the possibility of some closer association between Airco and BOC. (Smith 1722-23) The meeting took place on June 30, 1973 in London. (Giordano 1995-96; Smith 1723) Mr. Giordano asked Mr. Smith [D 25]

(CX 78-A) The meeting led to a decision that the two companies would set up working parties to consider the possibilities of further association. (Smith 1723-24, CX 78) These working parties functioned through the summer of 1973; at a meeting in New York, financial data were exchanged. (Laister 2546-47; Giordano 1973-77; Smith 1849-50; CX 301; RAX 83)

330. In the fall, Curtiss-Wright entered the picture, informing Airco that it would make a tender offer for Airco stock. (Dillon 2587-89) Following a meeting of the Airco board, Airco's chairman, George Dillon, sent Mr. Giordano to London to determine whether BOC was willing to make an offer. (Dillon 2592)

331. The Airco board concluded that the Curtiss-Wright offer should be opposed: the price offered was too low, and Curtiss-Wright would make a poor partner. (Dillon 2592-93) This

decision was communicated to Curtiss-Wright, together with a statement that Airco and BOC were engaged in discussions which might lead to an offer by BOC. (Dillon 2595) Curtiss-Wright then announced that its offer would not be forthcoming. (Ibid.)

332. Following the abortive Curtiss-Wright proposal, the Airco and BOC working parties continued to examine the possibilities of combination or amalgamation. Messrs. Smith and Dillon agreed that, following January 1, 1974, the top managements of the two companies would meet to consider the question. (Dillon 2595-96)

333. Curtiss-Wright, however, short-circuited these plans. On December 3, 1973, it made a tender offer for 2.4 million shares of Airco at $18 a share. (Dillon 2596-98; Laister 2550). In swift response, BOC made the tender offer which led to the acquisition here in issue. (Laister 2551-52)

334. In view of BOC's policy against making a takeover bid for a company without the support of its management (Smith 1858; Laister 2557), the circumstances extant in the second half of 1973 provided a most unusual opportunity. The price of Airco stock was at an historic low. Airco had no large single stockholder whose existence would discourage takeover bids. (Dillon 2585-86) It was the subject of rumors of possible takeover bids, one of which matured. Thus, the circumstances were such that Airco's management actively sought to have BOC acquire an interest in Airco, and the price of Airco stock was such as to make it commercially feasible

for BOC. (Giordano 1995-97)

335. Indeed, Airco provided BOC with an opportunity to enter the United States industrial gases business on a national scope at a price which yielded a modest but reasonable return on the enormous investment required. (Smith 1729-30, 1732 and 1736; Laister 2553-58) Mr. Laister explained that, with Airco's earnings estimated at $2 per share after taxes, Airco stock would yield 10% on an investment of $20 per share -- which could be consolidated on BOC's income statement because BOC owned more than 20% of Airco's stock. As the interest cost on the loan used to finance the purchase was about 10% before taxes -- 4.8% after taxes[1/] -- BOC would earn about 5% on its Airco investment. (Laister 2553-56, 2657)

336. Another significant fact unique to Airco was BOC's long relationship with Airco and its management. BOC and Airco had had a joint venture in the plant-building field from 1967 until 1971 during which their managers had come to know and respect one another. (Smith 1716-21; Laister 2687; Giordano 1933-34, 1948-50)

337. Of course, a number of factors which led BOC to make its offer for Airco stock were not peculiar to Airco. BOC had long regarded the United States as the largest industrial gas market in the world and as a technological leader. (Smith 1728; Laister

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1/ The British corporate tax rate for 1973 was 52% and interest is deductible against income. Income and Corporation Taxes Act 1970, c. 10, §§ 248, 243(6); Finance Act 1974, § 7.

2658) It made no secret of its interest in the United States, but had simply concluded that there was no feasible way to enter. (Smith 1710; Laister 2659) Moreover, BOC regarded it as desirable to be a major competitive force in the United States, since the two leading American producers -- Union Carbide and Air Products -- were competing with BOC around the world. (Smith 1728-29; Laister 2655-58)

338. But the fact was that BOC had written off the United States. Whatever the desirability of entry into the United States, BOC had operated successfully for 75 years without being there (Laister 2659), and it was only the unique combination of the drop in New York Stock Exchange prices that made Airco both a good buy and a willing partner that brought BOC in. BOC's acquisition, in these circumstances, is not inconsistent with its pre-existing policy of not entering the United States.

G. Conclusions

339. BOC would not have entered the United States industrial gases field in the foreseeable future by any means, but for its acquisition of an interest in Airco.

340. This conclusion is based on the testimony of BOC's executives and is supported by internal documents written before the prospect of litigation arose. In addition, the objective criteria strongly buttress the view that BOC's acquisition of an

interest in Airco was a unique response to a unique set of circumstances.

341. The barriers to de novo entry and the economic risks inherent in any such attempt indicate that such a course of action would have been most unlikely, quite apart from BOC's disavowal of any intention to undertake it. It simply cannot be expected that any prudent business would have undertaken an investment likely to exceed $240 million with only an uncertain prospect for a return and even that prospect many years away.

342. Similarly, entry by acquisition of a firm smaller than Airco cannot be regarded as having been likely. Entry at the distributor-producer level would be substantially equivalent to de novo entry and unlikely for the same reasons. Entry by acquisition of one of the intermediate-sized companies was hardly likely since the companies involved were either unavailable, or unattractive due to their poor performance, or both. Moreover, extending them beyond their geographic and product specializations would entail great expense and encounter many of the problems of de novo entry.

343. Specifically, Chemetron had an erratic record of performance and had already demonstrated that its management would not have acquiesced in an effort by BOC to obtain a majority interest. BOC had already demonstrated that it was not interested

either in a minority position or in a fight with management for control. Liquid Air and Liquid Carbonic are subsidiaries of larger corporations which have given no indication of an interest in disposing of them. Big Three, while a successful regional company, would have been extremely expensive as a result of its high price-earnings ratio, a fact which would also make an investment in Big Three considerably less attractive than an investment in Airco. Finally, Burdett of Cleveland was not an attractive acquisition, as attested by numerous witnesses, because of its poor financial performance, its heavy debt load, and its limited market area.

344. L'Air Liquide's 1969 entry into the United States by acquisition does not undercut the conclusion that BOC would not have been likely to take a similar route. L'Air Liquide entered by acquisition of American Cryogenics, a firm with sales of $20 million and sales of industrial gases of $13 million. Almost immediately thereafter, it acquired another firm in an adjacent geographic area with total sales of $18 million and gases sales of nearly $8 million. The only conceivable acquisition today comparable in size to those made by L'Air Liquide in 1969 is Big Three -- which appears to be unavailable, very expensive, a less profitable acquisition than Airco and beyond BOC's financial means. Burdett of Cleveland, which is the only firm now comparable in size to American Cryogenics in 1969, would be an unlikely choice by BOC for reasons already discussed.

345. Another significant difference between the prospect facing BOC in 1973 and that which was before L'Air Liquide when it entered the United States some years ago is that there are far fewer independent gas producers available for acquisition today, making the possibility of building a national competitor from a series of acquisitions in the L'Air Liquide fashion much more difficult. When L'Air Liquide bought American Cryogenics in mid-1969, it knew that Industrial Air Products, a dominant firm in the Pacific northwest area immediately adjacent to the area served by American Cryogenics, was a potential acquisition of substantial size. In fact, it may have been aware of the existence and potential availability of Dye Oxygen, serving the southwest and also adjacent to American Cryogenics' marketing area, and Gulf Oxygen, both companies more than twice as large as any of the small independents existing in 1973. Thus, L'Air Liquide could view the possibility of significant expansion via a series of substantial acquisitions as a reasonable possibility in 1969, but no such possibility existed in late 1973. This fact was relied upon by a number of witnesses in support of their view that entry by BOC was unlikely and not advisable. (Cunningham 942; Kridl 2206; Giordano 1957-58)

346. A final consideration relevant here is the general unattractiveness of the industrial gases business in the United States. While the United States gases field was said to account for half of the world's gases business, the performance of the

industry as a whole over the past ten years has not been good. Its profitability is low by comparison with the balance of the chemical industry and with manufacturing industries in the United States in general. More to the point, the profitability of the firms in the industry is considerably below that of BOC. The industry has been plagued with a weak price structure and with periods of excess capacity. While prices are said to have firmed within the past year and some of the excess capacity to have been replaced by slight shortages in limited areas, this change in conditions is contrary to the long-term trends. As Mr. Smith of BOC suggested, a decision involving the heavy commitment which entry into the United States would entail must be made on the basis of a long-term view of the industry rather than an atypical brief period. (Smith 1752-58)

(7)

Conclusions -- The Competitive Effects of Entry by BOC

A. Competitive Effects of BOC's Acquisition of an Interest in Airco

347. Complaint counsel have not sought to demonstrate that the effect of BOC's acquisition of an interest in Airco may be substantially to lessen competition or to tend to create a monopoly in the alleged market except insofar as the possibility of such an effect may be inferred from the evidence relating to concentration. In light of the full hearing record, it is impossible to conclude that complaint counsel have sustained their burden of proving the requisite anticompetitive effect.

348. First, complaint counsel have failed to prove that BOC was a perceived entrant into the United States industrial gas industry exerting a pro-competitive influence on the industry from the fringes of the market. The testimony of complaint counsel's industry witnesses -- witnesses whose business interests would probably cause them to be either neutral or hostile to this acquisition -- demonstrates that the possibility of entry by BOC did not influence competitive decision-making in the industrial gas industry. Further, their testimony fails to establish that any competitively significant segment of the industry regarded entry by BOC as a realistic possibility, although some regarded it as technically feasible.

349. Second, complaint counsel have failed to establish that this is an industry to which the doctrine of potential competition applies, i.e., an industry where there are dominant participants engaging in interdependent or parallel behavior with the capacity effectively to determine price or the total output of goods and services. On the contrary, the record establishes that the industrial gas industry is highly competitive. The industry has been characterized by intense price competition manifested in a long history of price declines. Structural factors in the industry, including its high fixed cost structure and the lack of any product differentiation, promote price competition. Other structural factors -- notably an omnipresent threat of additional backward integration by the industry's biggest customers and the great economic power and concentration on the buyers' side -- operate to set far more immediate limits on the industry's pricing than the distant possibility of foreign entry. The industry has been plagued by overcapacity which -- despite some limited recent shortages for certain products coincident with federal price controls -- demonstrate the industry's inability over the long term to limit output in order to raise prices. Moreover, the profitability and rates of return of the industrial gas companies are low by comparison to other manufacturing and chemical industries and certainly do not evidence the reaping of monopoly or oligopoly profits.

350. The concentration ratios upon which complaint counsel place exclusive reliance in seeking to trigger application of the potential competition doctrine and to demonstrate anticompetitive effects are insufficient to overcome this concrete evidence concerning the competitive state of the market. Assuming that each of the industrial gases or some groupings thereof constitute the only appropriate product markets, there is a total failure of proof, as there is no evidence in this record concerning concentration for any such markets. And assuming that industrial gases as a whole constitute the appropriate line of commerce, the concentration data are subject to serious question by virtue of the omission of some of the gases, the omission of nitrogen and hydrogen employed in major uses of those gases, and the reliance on value of shipments, f.o.b. plant, as a measure of performance despite the inconsistencies in the application of that measure from firm to firm and resultant distortions. Moreover, the concentration ratios that can be calculated from the record are not so high as to permit an inference of an anticompetitive effect for this acquisition on this record.

351. In sum, complaint counsel have failed to demonstrate that BOC's acquisition of an interest in Airco is likely to have any anticompetitive effects.

B. Assuming BOC Had Not Acquired an Interest in Airco, Would It Have Been Likely to Enter the United States and to Increase Competition in the Industrial Gas Industry?

352. Assuming that BOC had not acquired an interest in Airco, the likely future effect of its actions on competition in the United States industrial gas industry turns on two issues:

(1) Whether it would have entered the industry, either de novo or via an acquisition of another firm; and

(2) Assuming that it would have entered, whether such an entry was substantially likely to improve competition in the industry.

353. Complaint counsel have failed to establish that BOC was reasonably likely to enter the United States industrial gas industry.

354. First, the evidence concerning BOC's actual intentions -- the testimony of its executives supported by the Perham-Greenfield report, BOC's internal budgets and forecasts, and its other documents, documents written before there was a prospect of litigation -- lead only to the conclusion that BOC had no intention of entering the United States industrial gas industry by any means until a unique combination of circumstances made its acquisition of an interest in Airco both feasible and attractive.

355. Second, de novo entry cannot be regarded as feasible in light of the uncontradicted evidence of the enormous cost, great risk and low returns which it would involve. Similarly, entry by acquisition was not feasible in a realistic sense. Acquisition of one or more of the small independent producer-distributors would involve cost and risk comparable to de novo entry. And complaint counsel have failed to establish that any of the so-called "majors" was both attractive and available.

356. Even if it were assumed that BOC would have been likely to enter, complaint counsel have also failed to demonstrate that such entry would have had significant pro-competitive effects. In view of the findings as to the highly competitive nature of the industry, the structural factors insuring such competition, and the lack of proof of market power or oligopolistic pricing practices, there is no basis for assuming that entry by BOC, either de novo or via acquisition of a firm smaller than Airco, would have been reasonably likely to bring about any significant increase in the competitive conditions of the industry.

ARGUMENT

I

COMPLAINT COUNSEL HAVE FAILED TO DEMONSTRATE THAT BOC WAS A PERCEIVED POTENTIAL ENTRANT EXERTING A PRO-COMPETITIVE EFFECT FROM THE FRINGES OF THE INDUSTRY

The Supreme Court has recently said that "the principal focus of the [potential competition] doctrine is on the likely effects of the premerger position of the acquiring firm on the fringe of the target market." United States v. Marine Bancorporation, 42 U.S.L.W. 5210, 5216 (June 26, 1974). Thus, the basic inquiry in a potential competition case is whether "the acquiring firm's premerger presence on the fringe of the target market in fact tempered oligopolistic behavior on the part of the existing participants in that market." Ibid.

This inquiry has two parts.

First, was BOC perceived by the industry as a likely entrant? As complaint counsel recognized during the hearing, no potential entry by BOC could have affected the behavior of existing participants in the U.S. gases industry unless those participants thought BOC was likely to enter. (944)

And, second, if BOC was perceived as a likely entrant, did any firm guide its conduct in the light of that perception?

The record here yields affirmative answer to neither question.

A. Complaint Counsel Have Not Demonstrated that BOC Was Perceived as Reasonably Likely to Enter

Top executives of the third, fourth, and fifth largest companies in the industry -- Airco, Chemetron and Liquid Air -- testified that they never thought that BOC would enter. The only witness who unequivocally testified to a contrary expectation was Mr. Kimerling of Alabama Oxygen -- so tiny a company operating in so small an area that, with all respect, it cannot be regarded as significant.

This leaves only the carefully worded testimony of Messrs. Flamm of Union Carbide and Baker of Air Products. Both testified in substance that they regarded BOC as capable of entering and more likely to do so than any other foreign company. But neither testified that he thought entry was reasonably likely and neither testified that he thought entry would be economically attractive to -- or a prudent course of action for -- BOC. Proposed Findings 186-90, 196-99.

Hence there is no testimony here on which to ground a finding that any significant segment of the industry perceived BOC as likely to enter.

Nor does any piece of documentary evidence suggest any such perception of BOC. Rather, the only relevant document looks the other way. In a speech delivered in May 1973, Air Products' planning coordinator suggested no possibility of foreign entry. Instead, he listed the seven leading firms as of that date and squarely predicted: " . . . although there may be shifts in relative rank, the same companies should continue to dominate the U.S. production of oxygen and nitrogen for the foreseeable future." (BOC RX 260-F)

This failure to show BOC a perceived likely entrant is fatal to complaint counsel's position. For if firms in the market regard the firm at the edge as capable, but unlikely, to enter, its presence or absence at the fringe can have no effect in their competitive conduct, and so its removal can have no effect on competition.

The Supreme Court so recognized in United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210, where the Court defined the "fringe" or "wings" effect as:

> "the probability that the acquiring firm prompted premerger procompetitive effects within the target market by being perceived by the existing firms in that market as likely to enter de novo." Id. at 5216-17 (emphasis added).

Several commentators cited with approval in Marine Bancorporation[1/] are in accord in stating that proof of the "fringe effect" requires proof that those in the market regard entry as reasonably likely. For example, one commentator stated that one of the four conditions essential to finding a violation based on the fringe effect was that "the firm outside the market must be perceived by those within the market as likely to enter and as likely to enter in a way that firms in the market would want to deter." Note, United States v. Falstaff Brewing Corporation, Potential Competition Re-examined, 72 Mich. L. Rev. 837, 842 (1974).[2/] See also Turner, Conglomerate Mergers and Section 7 of the Clayton Act, 78 Harv. L. Rev. 1313, 1363 (1965); Berger & Peterson, Conglomerate Mergers and Criteria for Defining Potential Entrants, 15 Antitrust Bull. 489, 490 (1970).

1/ Supra, 42 U.S.L.W. 5210, 5217 n. 27.

2/ Hereafter cited as Potential Competition Re-examined.

This requirement simply has not been met in this case.

Moreover, the objective economic evidence as to barriers to entry -- high cost, low profitability, weak price structure and the like -- indicates that informed, rational participants could not have regarded entry as prudent, attractive or reasonably likely. See Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5221 (when "rational" businessmen must be assumed to perceive barriers to entry, pro-competitive influence from the fringe is unlikely).

B. The Competitive Behavior of The Industrial Gas Industry Was Not Affected by BOC

Complaint counsel's failure to show that BOC was regarded as likely to enter is dispositive of the "fringe effect" branch of the potential competition doctrine. But even assuming that complaint counsel had made such a showing, they would have been only half way home: they also had to prove that BOC's "premerger presence on the fringe of the target market in fact tempered oligopolistic behavior on the part of existing participants in that market." Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5216 (emphasis added). That is to say, complaint counsel had to

show that the threat of entry by BOC influenced "the firms already in the market . . . in their pricing and marketing decisions." United States v. Falstaff Brewing Corp., 410 U.S. 526, 559 (1973) (Marshall J., concurring). There was no such showing.

Rather, the record is all the other way. The testimony of the industrial witnesses, both those called by complaint counsel and those called by respondents, was entirely consistent: no pricing or marketing decision made by any firm employing any witness was ever influenced by the possibility that BOC might enter. Proposed Findings 200-02.

This testimony is fully consistent with the objective economic facts.

First, we have already seen that sophisticated participants in the United States industrial gas industry had to have been aware of the factors making entry by BOC unlikely and unattractive -- the high barriers to entry, great risks and

low profitability.[1/] Hence, even if they thought entry by BOC to be a possibility, they must have regarded it as remote not only in the sense that it was unlikely to happen, but also in the sense that, even if BOC did enter, entry would be unlikely on a scale that would significantly affect competition in any reasonable span of time.

Second, the objective economic facts indicate that other firms were more likely to enter, or faced lower entry barriers, than BOC. The significance of these facts lies in the economics of the potential competition doctrine. As we have seen, a premise of the doctrine is that participants in an oligopolistic industry will consider the risk of attracting new entrants in making price and marketing decisions. It assumes that these firms will believe that a new entry will detrimentally affect the profitability of the existing participants. Accordingly, the theory assumes that the existing participants will lower their prices "to a point where this threat to future profitability is deterred but where it continues to earn a supernormal rate of return made possible by the oligopolistic setting. In other words, the presence of perceived potential entrants

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1/ The existence of high barriers to entry, which restrict the acquiring firms' ability to enter de novo, is essentially inconsistent with application of the potential competition theory. As the Supreme Court has stated, "ease of entry on the part of the acquiring firm is a central premise of the potential competition doctrine." Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5217; see also id. at 5217-18 n. 32.

may cause firms in a concentrated market to limit-price." Potential Competition Re-examined, 72 Mich. L. Rev. 837, 841-42 (1974); accord, e.g., Bain, Barrier to New Competition 22 (1956).

Implicit in the theory is the fact that in order for a perceived potential entrant to exert a fringe effect on the market, it must be significantly more likely to enter than other firms. Potential Competition Re-examined, 72 Mich. L. Rev. 837, 842, 843-44 (1974); Berger & Peterson, Conglomerate Mergers and Criteria for Defining Potential Entrants, 15 Antitrust Bull. 489, 493-95 (1970); Davidow, Conglomerate Concentration and Section Seven: The Limitations of the Anti-Merger Act, 68 Colum. L. Rev. 1231, 1244-45, 1247 (1968); Turner, Conglomerate Mergers and Section 7 of the Clayton Act, 78 Harv. L. Rev. 1313, 1363-64 (1965).

As we have seen, tonnage users, particularly those such as U.S. Steel, which have already back-integrated into production for their own use, are fully capable of entering the industry and would have several important advantages not enjoyed by BOC. First, many of the back-integrated tonnage users have financial resources far superior to those of BOC, e.g., U.S. Steel and Ford. Second, such tonnage users have established base

loads for their plants -- the demand of their own steel or chemical facilities. This would greatly reduce the financial risks of entry. Moreover, these tonnage users would have important advantages in dealing with the backup problem, both because their captive plants could provide some backup and because their status as major customers of the industrial gas companies would give them more leverage in obtaining backup from those sources.[1/] Hence, while the barriers to entry into the industrial gas business are concededly high, the barriers could be overcome with greater ease by many large tonnage users in the United States than by a foreign entrant such as BOC.

Apart from the tonnage users, it would seem that Linde A.G. and Messer Griesheim, at least, should be regarded as more likely to enter than BOC, since both have major advantages in the form of established United States organizations, greater financial resources or both. Proposed Findings 207-12.

1/ Of course, a company such as U.S. Steel, entering the industrial gas business from a back-integrated base, would not have to supply all of its own requirements for industrial gases. Indeed, it would probably be advantageous not to do so for the precise purpose of maintaining its leverage with the industrial gas companies. This is a phenomenon well recognized in the economic literature. Scherer, Industrial Market Structure and Economic Performance 247-48 (1970).

In sum, the large tonnage users, and perhaps other foreign companies, represented a more immediate threat to the industrial gas companies than the possibility of entry by BOC. This necessarily implies that, if the industrial gas companies were engaged in limit-pricing -- a supposition wholly unsupported in the record -- their limit-prices would be designed to forestall entry by large tonnage users, Messer and Linde A.G. -- not BOC.

II

COMPLAINT COUNSEL HAVE FAILED TO SHOW THAT BOC WAS AN ACTUAL POTENTIAL ENTRANT WHOSE ENTRY WOULD HAVE BEEN LIKELY TO LEAD TO FURTHER DECONCENTRATION OF THE INDUSTRY OR OTHER SIGNIFICANT PRO-COMPETITIVE EFFECTS

Complaint counsel suggest that BOC's acquisition of an interest in Airco eliminates a prospect for deconcentration of the gases industry over the long term that might result from a de novo or toehold entry by BOC. (Cpt. ¶ 27[a])

The Supreme Court has yet to determine whether proof of such a possibility renders an otherwise unobjectionable acquisition unlawful.[1/] But it has held that the question need not even be reached unless there is first proof that there were feasible means available for entry and that "those means offer a substantial likelihood of ultimately producing deconcentration of that market or other significant procompetitive effects." United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5219, 5221.

And before getting to either of these questions, complaint counsel must show that, had the Airco opportunity not come along, BOC would have been likely to use some other means to enter.[2/]

1/ The Supreme Court expressly reserved decision on this issue in both Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5217, and Falstaff, supra, 410 U.S. 526, 537 (1973).

2/ This was not at issue in Marine Bancorporation, supra, since there was no dispute that the acquiring bank was both able and anxious to enter the target market. 42 U.S.L.W. 5210, 5219.

E.g., United States v. Atlantic Richfield Co., 297 F. Supp. 1061, 1072 (S.D.N.Y. 1969), aff'd, 401 U.S. 986 (1971); see Missouri Portland Cement Co. v. Cargill, Inc., 1974 CCH Trade Cas. ¶ 75,113, at 96,956 (2d Cir. 1974).

The evidence here meets none of these three tests.

A. BOC Was Not Shown to Be Reasonably Likely to Enter Other than by Acquisition Of an Interest in Airco

Complaint counsel totally failed to demonstrate that BOC would have been likely to enter had the Airco relationship not become available. Indeed, the record demonstrates the contrary, by both subjective and objective evidence.

First, it is difficult to imagine a record which could more plainly establish the actual intentions of BOC. The executives of BOC all testified that the company did not intend to enter the United States industrial gas industry, either de novo or by acquisition of a company smaller than Airco. That testimony is supported in every particular by documents from BOC's files dating back more than six years -- documents filled with statements that BOC did not regard entry as economically attractive or feasible. Moreover, BOC's internal budgets, forecasts and projections through 1978 are quite inconsistent with any suggestion that it planned to enter the United States market -- as no funds were allocated for that purpose.

Thus, the documents prove conclusively that BOC's acquisition of an interest in Airco was precisely what BOC's executives said it was: a unique reaction to an unplanned, unexpected and unique set of circumstances.

This evidence, particularly the documentary evidence, is critical. In General Mills, Inc., 3 CCH Trade Reg. Rep. ¶ 20,457 (FTC 1973), the Commission relied on just such testimony and internal documents in concluding that General Mills was not a likely or potential entrant into the frozen fish market. Id., at 20,360-64.

Moreover, the Supreme Court's decision in Falstaff, supra, 410 U.S. 526, confirms that testimonial evidence alone may be dispositive. In Falstaff, the district court found, on the basis of the testimony of Falstaff executives, that Falstaff would not have entered the New England beer market absent its acquisition of Narragansett. Id., at 530-31. While the Supreme Court reversed and remanded, it did so only on the ground that the district court had failed separately to consider whether Falstaff exerted a fringe effect on the New England beer market. Id., at 532-33. The Supreme Court explicitly accepted the district court's finding "that ... Falstaff, as a matter of fact, would never have entered the market de novo." Id., at 532. See Robinson, Antitrust Developments: 1973, 74 Colum. L. Rev. 163, 184-85 (1974); Fox, Toehold Acquisitions, Potential Toehold Acquisitions, and Section 7 of the Clayton Act, 42 Antitrust L. J. 573, 583 (1974).

While this "subjective evidence" as to the likelihood of BOC's entry is conclusive, particularly in light of Falstaff and General Mills, there is also "objective evidence" which is fully consistent.

To begin, it was complaint counsel's burden to show that de novo or toehold entry was economically feasible and attractive. Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5219, 5221; Missouri Portland Cement Co. v. Cargill, Inc., 1974 CCH Trade Cas. ¶ 75,113, at 96,955 (2d Cir. 1974); United States v. Falstaff Brewing Corp., 332 F. Supp. 970, 972 (D.R.I. 1971), rev'd on other grounds, 410 U.S. 526 (1973); see United States v. Atlantic Richfield, 297 F. Supp. 1061 (S.D.N.Y. 1969), aff'd, 401 U.S. 986 (1971); General Mills, Inc., 3 CCH Trade Reg. Rep. ¶ 20,457 at 20,364-65 (FTC 1973); cf. Sterling Drug Co., Inc. 80 F.T.C. 477, 606 (1972).

But complaint counsel made no serious effort to demonstrate that de novo entry was economically feasible and no effort whatever to show that it would have been reasonably attractive.

The only evidence offered on this score was the testimony of Messrs. Baker and Flamm to the effect that it was "possible" for BOC to enter by building new plants. There was no evidence at all to the effect that such a course of action would have been reasonably likely to yield even a modest profit.

Moreover, after BOC offered testimony that de novo entry designed to produce a viable national competitor would have cost almost $250 million, taken at least 10 years to show a profit, and would not have been a prudent business decision, complaint counsel offered no rebuttal. Instead, they recalled Mr. Baker of Air Products, who merely repeated his conclusory assertions that de novo entry would be possible -- all one had to do was build a plant -- and that this is a relatively "opportune" time for doing so. (Baker 2733-35)

In light of this record, the remarks of Judge Friendly in the Missouri Portland Cement case are particularly apposite here:

> "The evidence against the feasibility of de novo entry by Cargill is overwhelming, and the District Judge made no finding that this was an attractive possibility or that anyone inside or outside of Cargill ever thought it was. Whatever the ultimate resolution of the differing views of Mr. Justice White and Mr. Justice Marshall on the weight to be given statements by management of the acquiring company, contrast 410 U.S. at 534-36 with id. 563-70, here the objective evidence was also in accord with the views expressed by Cargill's management. The attempt to construct facilities similar to [Missouri Portland's] which Cargill hoped to acquire for $45,000,000 would cost up to $200,000,000." Missouri Portland Cement Co. v. Cargill, Inc., supra, 1974 CCH Trade Cas. ¶ 75,113, at 96,955 (footnote omitted).

The situation is much the same with respect to complaint counsel's toehold theory. To begin, BOC's management had rejected the possibility of toehold entry for much the same reasons as it rejected de novo entry: in their view, acquisition of one or

more small producer-distributors would have amounted to essentially de novo entry and would have involved the same costs and risks. And BOC considered the few larger companies in the business economically unattractive or unavailable or both. Again, complaint counsel offered no persuasive evidence that the testimony of respondents' witnesses on these points was not reasonable. 1/

The "objective evidence" supports BOC's view that entry by acquisition of a firm or firms smaller than Airco was not economically feasible or attractive.

To begin with the small producer-distributor end of the market, the only evidence of the availability of firms for acquisition was with respect to Burdett of Norristown, Northern Gases & Supply Co. and perhaps Alabama Oxygen. Executives of Burdett and Northern testified that their firms were "available", but there was no evidence offered with respect to the asking prices or the profitability, if any, of those companies. The situation was

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1/ For example, Mr. Baker testified without elaboration that there were a number of small firms that "would certainly accelerate the pace of an entrance into this market through their acquisition." (Baker 2750) Of course, that is true for virtually any company in any business. Since Mr. Baker did not identify those companies, there was no showing that any was available. Moreover, complaint counsel never addressed the hard question -- would the investment required to meet the costs of acquisition and costs of expansion be likely to yield a return sufficient to make entry by acquisition of a small company reasonably attractive?

similar with Alabama Oxygen, except there was no direct testimony that the company was available. Hence, there is simply no basis for concluding that acquisition of these firms was attractive or economically feasible. Moreover, in light of BOC's rejection of overtures from Burdett of Norristown -- overtures involving possible acquisition of both that company and Alabama Oxygen -- the likelihood of a BOC entry via those companies cannot be regarded as having been established.

Assuming arguendo that Burdett of Norristown, Alabama Oxygen and Northern Gases were available on reasonable terms and that they were profitable, this record shows that entry, even by acquisition of all three, was not an attractive or feasible possibility for a firm interested in becoming a factor in a national market. These three firms are located in Norristown, Pa., Bessemer, Ala., and Milwaukee, Wis. -- so far apart that their amalgamation could not offer any significant advantage, as their production facilities could not be combined and they could not transship product. Moreover, their production facilities are all far smaller than the size which complaint counsel's own witnesses testified was the smallest that could economically be operated. Further, their total shipments of gases produced in 1972 amounted to between $3 and $4 million, considerably less than 0.5% of any "market". Hence, acquisition of this trio would provide a new entrant with little more than a group of widely separated obsolete plants and some modest distribution facilities. Any effort to become a national

competitor from this base, as BOC's witnesses testified, would be essentially the same as a de novo entry.

Again Judge Friendly's analysis in Missouri Portland is particularly apt here:

> "The 'toe-hold' notion is rather difficult to understand as applied to a capital intensive industry where objective facts rule out de novo entry and the proposed entrant has no interest in entering unless it can obtain a significant market share. The cost of converting a small plant into a big one would probably be as great as or perhaps greater than that of a building a new one. Toe-hold acquisition may therefore be meaningful in an industry like cement only if the new entrant could make a number of such acquisitions having capacity substantially equivalent to that of the larger company sought to be acquired." Missouri Portland Cement Co. v. Cargill, Inc., supra, 1974 CCH Trade Cas. ¶ 75,113 at 96,956.

Such a group of acquisitions was not shown to have been possible, much less attractive.

Turning to the prospect of acquisition of one of the intermediate size firms, there is a total failure of proof of either availability or attractiveness. Two of these firms -- Liquid Air and Liquid Carbonic -- are subsidiaries of larger companies and there was no effort made to show that either was available to BOC or to any other prospective entrant. Precisely such a failure resulted in the dismissal of the plaintiff's toehold theory in Missouri Portland, supra, ¶ 75,113 at 96,956.

The other two firms in this category -- Chemetron and Big Three -- suffer from this and other disabilities. First, neither was shown to be available. Indeed, the record clearly showed that Chemetron's management would have been hostile to an effort by BOC to acquire a majority of that company, and such evidence as there is indicates that Big Three's management would have taken a similar view. Further, Chemetron has plainly had a poor financial record in recent years, a record that both respondents' expert and BOC management testified rendered it an unattractive acquisition candidate. This evidence was not rebutted by complaint counsel. Finally, Big Three, while a highly successful regional firm, was too expensive for BOC to acquire and its limited geographical scope would have made an effort to build it into a significant national competitor substantially as expensive and risky as de novo entry.

Still another factor excludes Chemetron, Liquid Carbonic and Big Three as possible toehold acquisitions. Liquid Carbonic and Chemetron rank first and second in the sale of carbon dioxide in the United States. Big Three is the dominant gas company in the Gulf Coast region, with over 35% of the market in the region as a whole and more than 50% in the Houston area. Hence, acquisition of any of these firms would have posed Section 7 problems

far more real than Airco.[1/]

These are appropriate considerations in evaluating these firms as possible acquisitions. As Judge Friendly said in Missouri Portland:

> [W]e think Missouri Portland completely failed to demonstrate that attractive toe-hold prospects were available in the relevant geographical markets. The plants cited as available means of entry into the defined markets are either already dominant in some other market, or owned by enormous national or international cement companies or poor prospects for the future." Missouri Portland Cement Co., supra, ¶ 75,113, at 96,956 (emphasis added); accord, id., at 96,956 n. 29.

Hence, when the hard realities of entry by acquisition are confronted -- the lack of suitable acquisitions, the high costs of acquisition, and the high costs and risks of development of any acquisition into a national competitor -- there has simply been no showing that entry by acquisition of a firm smaller than Airco was economically feasible or desirable.

Indeed, putting this to one side, BOC's acquisition of an interest in Airco can be defended by resort to the toehold theory. Both the Antitrust Division and the FTC have indicated

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1/ Carbon dioxide is a relevant product market. United States v. General Dynamics Corp., 258 F. Supp. 36 (S.D.N.Y. 1966). Moreover, in light of such cases as United States v. Pabst Brewing Corp., 384 U.S. 546 (1966), the Gulf Coast or the Houston area would undoubtedly be a relevant geographical market.

that toehold acquisitions will not normally be opposed.[1/] In the Bendix case, in which the Commission gave birth to the toehold theory, the Commission indicated that Wix, the third largest company with 9.5% of the market, was a toehold acquisition preferable to Bendix's acquisition of Fram. Bendix Corp., 77 F.T.C. 731, 820-24 (1970). See also Missouri Portland Cement Co., supra, ¶ 75,113, at 96,951 n. 10, citing with approval Note, Toehold Acquisitions and the Potential Competition Doctrine, 40 U. Chi. L. Rev. 156, 179 (1972), and Fox, Toehold Acquisitions, Potential Toehold Acquisitions, and Section 7 of the Clayton Act, 42 Antitrust L. J. 573, 582 (1973).

Here Airco's market position is substantially the same as that of Wix in Bendix; it is the third largest firm with less than [D 26] of the value of national production. Hence, in view of the Commission's stated views, this acquisition should not be held to violate Section 7.

1/ Speech by Thomas E. Kauper, Assistant Attorney General, Antitrust Division, Oct. 4, 1972, 5 CCH Trade Reg. Rep. ¶ 50,149, at 55,253; Jewel Companies, Inc., CCH Trade Reg. Rep. ¶ 19,804 (FTC 1971).

B. In Any Event, There Was No Showing that De Novo or Toehold Entry by BOC Would Have Improved Competition in the Industry

Even assuming that BOC had been demonstrated to have been likely to enter the United States industrial gas industry but for its acquisition of an interest in Airco, there is no basis for concluding on this record that such an entry would have had any significant pro-competitive effect. And in light of Marine Bancorporation, supra, 42 U.S.L.W. 5210, it is clear that independent proof of the likelihood of such an effect is essential to complaint counsel's case. Id., at 5219-21.

To begin, complaint counsel called no witnesses and adduced no other evidence which directly supported the view that entry by BOC would have made the industry more competitive or led to decreased concentration. In fact, they did not even put such questions to the principal witnesses who testified that entry was possible, Messrs. Baker and Flamm. Hence, any conclusions along these lines must rest solely on inferences drawn from other evidence.

It appears rather clearly, we submit, that entry via acquisition of a firm or group of firms smaller than Airco would not have led to deconcentration or other pro-competitive effects. Such an entry would initially have no effect at all, as it would merely change the ownership of existing competitors. Moreover,

the likelihood of deconcentration or other pro-competitive effects by development of an acquired firm is not great. Assuming the acquisition was in the small producer-distributor end of the industry, the same barriers that would block a de novo entry would render significant expansion difficult and unlikely. Moreover, these firms are so small that acquisition of even the three which complaint counsel suggested were "available" would have given BOC a market share substantially below one percent and only a minute geographical coverage -- hardly a base from which seriously to threaten the large firms in the industry. Further, there is no reason in this record to believe that acquisition and expansion of an intermediate-sized company would result in any more than a shuffling of the rankings of the seven major firms -- with either no change in concentration or increased concentration.

This view is confirmed by the experience of Liquid Air, the entry of which was such a major portion of complaint counsel's affirmative case. Whatever changes may have been effected in the profitability of the two companies that Liquid Air acquired -- American Cryogenics and Industrial Air Products -- it is plain that Liquid Air has not significantly expanded those businesses except by further acquisitions. When Liquid Air acquired American Cryogenics and IAP in 1969, those firms had sales of industrial gases of more than $21 million. By 1972 their industrial gas sales

had grown to $26.2 million, an increase of only $5 million over three years. Since this represents an increase of considerably less than one percent of the 1969 shipments reported to the Census Bureau,[1] it is unlikely that the relative market position of what by 1972 was Liquid Air was significantly different from that occupied by its constituent parts -- American Cryogenics and IAP -- in 1969.[2] Hence, the entry by acquisition of L'Air Liquide, the world's largest industrial gas company, has had no significant effect on the industry in the United States.

Similarly, it cannot reasonably be concluded on this record that de novo entry by BOC would have been likely to have had a significant pro-competitive effect on the industry. The barriers to de novo entry, as we have seen, are high -- it is impossible to guess whether BOC could have surmounted them successfully. Moreover, the industry is already highly competitive. On balance, it cannot be said that de novo entry by BOC would have been likely to produce a significant increase in competition -- on this record, it is at least equally possible that BOC would have added nothing.

1/ BOC RX 53.

2/ This view is confirmed by the two 1968 reports rendered by Arthur D. Little, Inc., which show that the 1968 market position of American Cryogenics and IAP was essentially the same as that of Liquid Air in 1972. (Compare BOC RX 58-Z-32 and CX 232-Z-2 with CX 325.)

And so a finding that entry by BOC would have been likely to lead to significant pro-competitive effects could be based only on speculation -- in the face of significant contrary evidence. In these circumstances, it is well to bear in mind the Supreme Court's recent reminder that "the concern of § 7" is "the loss of competition 'which is sufficiently probable and imminent' and that 'remote possibilities are not sufficient to satisfy the test set forth in § 7.'" Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5216 n. 22, quoting United States v. Continental Can Co., 378 U.S. 441, 458 (1964), and United States v. Falstaff Brewing Corp., 410 U.S. 526, 555 (1973) (Marshall, J., separate opinion). The tenuous inferences and speculation which complaint counsel offer simply do not rise to the level of probability and imminence which the Supreme Court requires.

III

The Doctrine of Potential Competition Does Not Apply to This Highly Competitive Industry

The foregoing discussion has assumed that the potential competition theory applies to this acquisition. However, the doctrine of potential competition is relevant in Section 7 cases only when the market in which the acquired company participates is oligopolistic and heavily concentrated. As the Supreme Court said just one month ago:

> "The potential competition doctrine has meaning only as applied to concentrated markets. That is, the doctrine comes into play only where there are dominant participants in the target market engaging in interdependent or parallel behavior and with the capacity effectively to determine price and total output of goods or services. If the target market performs as a competitive market in traditional antitrust terms, the participants in the market will have no occasion to fashion their behavior to take into account the presence of a potential entrant. The present procompetitive effects that a perceived potential entrant may produce in an oligopolistic market will already have been accomplished if the target market is performing competitively. Likewise, there would be no need for concern about the prospects of long-term deconcentration of a market which is in fact genuinely competitive." United States v. Marine Bancorporation, Inc. 42 U.S.L.W. 5210, 5218 (U.S. June 26, 1974). See also United States v. Penn-Olin Chemical Co., 378 U.S. 158, 174 (1964) (Applies to "Oligopolistic market"), quoted with approval in United States v. Falstaff Brewing Corp., 410 U.S. 526, 532 (1973).

The industrial gas industry, we submit, is highly competitive. The competitors in the business have not been

shown to have engaged in interdependent or parallel behavior. On the contrary, the record is filled with references to price wars and severe competition. And if one thing is clear on this record, filled as it is with evidence of declining prices, product surpluses, and low profitability, it is that the industrial gas companies in the United States do not have "the capacity effectively to determine price and total output." Hence, the doctrine of potential competition does not apply to this case.

A. Complaint Counsel Have Failed to Show that the Industrial Gas Industry Is Sufficiently Concentrated to Make a Prima Facie Case for Application of the Potential Competition Doctrine.

In the Marine Bancorporation case, supra, 42 U.S.L.W. 5210, the Supreme Court indicated the nature of the inquiry required in order to determine whether the doctrine of potential competition applies to an industry. It held that "by introducing evidence of concentration ratios of [sufficient] magnitude . . . the Government [may] establish a prima facie case that the . . . market [is] a candidate for the potential competition doctrine." Id. at 5218. In the event the government establishes a prima facie case by proof of sufficient concentration, the respondents may rebut that showing by demonstrating that "the concentration ratios, which can be unreliable indicators of actual marked behavior, see United States v. General Dynamics Corporation, U.S. [39 L Ed 2d 530, 542-45] (1974), [do] not accurately depict the economic

characteristics of the . . . market" and that the market is "genuinely competitive." Id. at 5218, 5219.

Here complaint counsel have failed to prove a prima facie case on the basis of the concentration ratios. First, there is no evidence pertaining to concentration and market shares for any of the individual gases and, as is demonstrated below, the market of all "industrial gases" alleged by complaint counsel is not a relevant line of commerce for Section 7 purposes. Second, even if it be assumed that "industrial gases" is a relevant line of commerce, there was nevertheless a failure of proof of a prima facie case, both because the data relied upon by complaint counsel are incomplete and unreliable and because the data do not show concentration of sufficient magnitude.

Finally, even if complaint counsel have made a prima facie showing, the record demonstrates that the industrial gas industry is highly competitive, thereby rebutting any prima facie case.

1. The Evidence of Concentration Relied Upon by Complaint Counsel Is Incomplete And Unreliable

Complaint counsel's attempt to demonstrate that the industrial gas industry is concentrated consist of these elements: (1) the identification of the eight largest companies by industry witnesses, and (2) the introduction into

evidence of (a) CX 325, a stipulation as to the 1972 value of shipments, f.o.b. plant, of gases included in the Census Bureau's standard industrial classification code 2813 for seven firms, [1/] and (b) CX 296, the preliminary report on SIC code 2813 of the 1972 Census of Manufacturers. By use of these two exhibits, complaint counsel presumably intend to calculate market shares of the eight largest industrial gas companies and concentration ratios for the industry. But use of these Census data would not accurately reveal either the market shares of the firms or the extent of concentration in the industry.

A basic shortcoming of complaint counsel's Census data is the fact that it is incomplete in major respects. As the proposed findings show, the use of f.o.b. plant value of shipments data excludes by definition industrial gases produced for consumption in the producing plants -- captive production. Moreover, the particular Census Bureau reports relied upon by complaint counsel exclude all propane, butane, propylene, halogenated hydrocarbons, cyclopropane, sulphur dioxide, chlorine and fluorine, despite the fact that all of these chemical elements and compounds are gases falling within the definition of industrial gases contained

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1/ The data for Union Carbide, the eighth firm, was given orally at the hearing. Proposed Finding 159.

in the complaint. Moreover, complaint counsel's Census data also exclude helium produced in government-owned plants, which probably accounts for half of all helium sales in the United States, and the hydrogen and nitrogen used in manufacturing synthetic ammonia and in petroleum refineries, the principal uses of those gases. While it is possible to estimate the value of some captive production as well as that of propane, butane and propylene, major deficiencies nevertheless remain.

This failure of proof cannot be overcome by a claim that captive production -- gases produced for use in the producing plant, e.g., U.S. Steel's production of oxygen for use in its own steel mills -- cannot be regarded as part of the "market". For one thing, such a notion overlooks economic reality. As this record amply demonstrates, production of gases by tonnage users is a realistic and frequently chosen alternative to purchasing gases from the industrial gas companies. Captive production, therefore, is a fact of everyday life to the industrial gas companies.

Moreover, it has consistently been the practice in antitrust litigation to include captive production in the product market, for these very reasons. For example, Judge Learned Hand, speaking for the Second Circuit in the landmark

Alcoa case, held that the aluminum produced by Alcoa to supply its own manufacturing operations had to be included in determining Alcoa's share of the overall aluminum market. United States v. Aluminum Co. of America, 148 F.2d 416, 424 (2d Cir. 1945). Judge Hand said:

> "There are various ways of computing Alcoa's control of the aluminum market -- as distinct from its production -- depending upon what one regards as competing in that market. The judge figured its share -- during the years 1929-1938, inclusive -- as only about thirty-three per cent; to do so he included secondary, and excluded that part of Alcoa's own production which it fabricated and did not therefore sell as ingot. If, on the other hand, Alcoa's total production, fabricated and sold, be included, and balanced against the sum of imported virgin and secondary, its share of the market was in the neighborhood of sixty-four per cent for that period. The percentage we have already mentioned -- over ninety -- results only if we both include all Alcoa's production and exclude 'secondary'. That percentage is enough to constitute a monopoly; it is doubtful whether sixty or sixty-four percent would be enough; and certainly thirty-three per cent is not. Hence it is necessary to settle what he shall treat as competing in the ingot market. That part of its production which Alcoa itself fabricates, does not of course ever reach the market as ingot; and we recognize that it is only when a restriction of production either inevitably affects prices, or is intended to do so, that it violates § 1 of the Act. Apex Hosiery Co. v. Leader, 310 U.S. 469, 501, 60 S.Ct. 982, 84 L.Ed. 1311, 128 A.L.R. 1044. However, even though we were to assume that a monopoly is unlawful under § 2 only in case it controls prices, the ingot fabricated by Alcoa necessarily had a direct effect upon the ingot market. All ingot -- with trifling exceptions -- is used to fabricate intermediate, or end, products; and therefore all intermediate, or end, products which Alcoa fabricates and sells,

> pro tanto reduce the demand for ingot itself. The situation is the same, though reversed, as in Standard Oil Co. v. United States, 221 U.S. 1, 77, 31 S. Ct. 502, 523, 55 L. Ed. 619, 34 L.R.A.,N.S., 834, Ann. Cas. 1912D, 734, where the court answered the defendants' argument that they had no control over the crude oil by saying that 'as substantial power over the crude product was the inevitable result of the absolute control which existed over the refined product, the monopolization of the one carried with it the power to control the other.' We cannot therefore agree that the computation of the percentage of Alcoa's control over the ingot market should not include the whole of its ingot production." Ibid.

Since the Alcoa decision, the necessity of including captive production in determining concentration and market shares has simply been taken for granted. In Bethlehem Steel, a Section 7 case, Judge Weinfeld found that the Ford Motor Company was the twelfth largest steel company in the United States, and took account of its production in considering the impact of the proposed merger of Bethlehem Steel and Youngstown Sheet & Tube on the steel industry, although Ford appears to have been only a captive producer of steel for its own automobile plants. United States v. Bethlehem Steel Corp. , 168 F. Supp. 576, 584-85, 603-05 (S.D.N.Y. 1958). And in Ford-Autolite, the District Court and the Supreme Court regarded AC Spark Plugs as being in the original equipment market despite the fact that they were produced by General Motors for use in General Motors cars. Ford Motor Company v. United States, 405 U.S. 562 (1972), aff'g 286 F. Supp. 407 (E.D. Mich. 1968).

Thus, the oxygen, nitrogen, hydrogen and other gases produced by major gas consumers for their own use must be considered in determining the market shares of the industrial gas companies and the concentration of the industry. And while estimates of some of the captive production may rationally be made on this record, complaint counsel have left major areas of captive production wholly untouched, most notably captive production of nitrogen and hydrogen by ammonia producers and petroleum refineries.

Putting aside the incompleteness of the data offered by complaint counsel, the choice of f.o.b. plant value of shipments is singularly inappropriate, as it is an unreliable measure as applied to this industry and may have resulted in serious distortions in the picture of the industry which complaint counsel seek to paint.

As the proposed findings of fact indicate, f.o.b. plant value of shipments is a concept with no practical application in the industrial gas industry. The universal practice of the industry is to sell gases on a delivered price basis. Distribution costs are a substantial factor in the business. Hence, in order to report on an f.o.b. plant value of shipments basis, the industrial gas companies must make ad hoc estimates of their distribution costs and deduct them from their sales.

If this process were done on a consistent basis throughout the industry, the inaccuracy might be unimportant. However, the record indicates that f.o.b. plant values are arrived at differently by different companies. Indeed, the proportion of total gas sales represented by the estimates of f.o.b. plant value of shipments reported to the Census Bureau ranged from 57% to 85% for the few companies for which such data are available.

We are fully cognizant of the Supreme Court's admonition that Section 7 cases do not require machine-like "precision in detail", but in the same breath the Court indicated that substantial accuracy "of the broad picture presented" was nevertheless essential. Brown Shoe Co. v. United States, 370 U.S. 294, 341 n. 69 (1962). And these disparities in calculating f.o.b. plant value of shipments may well have resulted in substantial distortion of concentration ratios and rankings of firms in the industry -- the essential elements of complaint counsel's paint-by-numbers approach to the Clayton Act.

If f.o.b. plant value of shipments were the only data available, complaint counsel could perhaps take some comfort in the Supreme Court's Brown Shoe dictum. However, there was an abundance of more reliable evidence available -- evidence which was not subject to the shortcomings inherent in f.o.b. plant values -- from which conclusions as to concentration might have been drawn.

For example, complaint counsel could easily have shown market shares and concentration by reference to production capacities of existing plants. Such a course would not have been fraught with the arbitrary estimates concerning distribution expenses which permeate the f.o.b. plant value of shipments statistics. In fact, this is the course taken by the Government in the Bethlehem Steel case, which involved another product with high distribution costs. United States v. Bethlehem Steel Corp., 168 F. Supp. 576, 587 (S.D.N.Y. 1958). Moreover, complaint counsel had begun collecting data on plant capacities almost one year before this proceeding was instituted.[1/]

Second, complaint counsel might have sought to prove their case by showing the actual production of each gas. This too would have had the virtue of eliminating the arbitrary and unpredictable consequences of distribution cost adjustments and would also have permitted inclusion of captive production on a more reliable basis. And again, complaint counsel began gathering these statistics almost a year before this proceeding was instituted.[2/]

The fact that the industry-wide investigation, in the course of which complaint counsel began gathering these

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1/ Motion of BOC respondents for a subpoena duces tecum, Exhibit A, ¶1.

2/ Id., p. 1, ¶ 2.

data, had not been completed by the time of the hearing is hardly an excuse for failing to use more complete and reliable evidence. Complaint counsel, as they repeatedly reminded the respondents during the hearing, could have issued third-party subpoenas. Indeed, they subpoenaed witnesses from many of the industrial gas companies. There was simply no good reason why data concerning production capacity and actual production could not have been obtained at the same time.

In view of the major deficiencies of the data relied upon by complaint counsel to establish concentration in the industrial gas industry, it is inappropriate to reach any conclusions with respect to concentration.

2. Even if Complaint Counsel's Evidence of Concentration Were Accepted, the Industrial Gas Industry Is Not Sufficiently Concentrated to Invoke the Doctrine of Potential Competition

Even if the deficiencies in complaint counsel's data were ignored, the record fails to show that the industrial gas industry is sufficiently concentrated to invoke the doctrine of potential competition.

The four largest firms in the industry accounted for [D 27] and the eight largest for 51.9% of the total value of

industrial gases produced in the United States in 1972. Proposed Findings 171-172. Even if the value of propane, butane and propylene were excluded, the share held by the four largest firms would have been less than 50.4% and that of the eight largest would have been less than 62.6%. This degree of concentration is not sufficient to establish a prima facie case for application of the doctrine of potential competition.

While the courts have not yet finally established the degree of concentration required to sustain the government's burden of proving a prima facie case, conclusions may be drawn from potential competition cases decided to date and from other relevant materials.

One of the cornerstones of economic theory underlying much of the law of antitrust is the hypothesis that a monopolist will always charge higher prices and produce less output than would competitors in a truly competitive market. Watson, Price Theory and Its Uses 316-17 (2d ed. 1968) A corollary of this premise is that a symptom of monopoly is unusually high profit over the long run. Bain, Price Theory 203-05, 340 (1952); Mason, Economic Concentration on the Monopoly Problem 368 (1957); see United States v. Aluminum Co. of America, 148 F.2d 416, 426-27 (2d Cir. 1945). Hence, in seeking a level of concentration the existence of which would trigger application of the doctrine of potential competition, absent

evidence that the market is genuinely competitive, one possible course would be to choose a concentration ratio associated with high levels of profitability.

Professor Bain of Harvard, whose work has repeatedly been relied upon by the courts and the Commission, especially in defining and applying the doctrine of potential competition,[1/] has studied the relationship between profits and concentration. He found "no conclusive indication of any closely observed linear relationship of industry concentration to profit rates." However, he stated:

> "The positive conclusion which does emerge is that there is a rather distinct break in average profit-rate showing at the 70 percent concentration line [for the eight largest firms], and that there is a significant difference in the average of industry average profit rates above and below this line." Bain, Relationship of Profit Rate to Industry Concentration, 1936-40, 65 Qtrly. J. Econ. 293, 313-14 (1951). Accord, Bain, Barriers to New Competition 191 (1962).

1/ United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5217-18 n. 32; FTC v. Proctor & Gamble Co., 386 U.S. 568, 586 n. 4 (1967) (Harlan, J., concurring); Stanley Works v. FTC, 469 F.2d 498, 503 n. 10 (2d Cir. 1972); Proctor & Gamble Co., 63 F.T.C. 1465, 1549 n. 19 (1963), rev'd, 358 F.2d 74 (6th Cir. 1966), rev'd, 386 U.S. 568 (1967). See also United States v. Philadelphia National Bank, 374 U.S. 321, 363 n. 39 (1963); United States v. E. I. Du Pont De Nemours & Co., 351 U.S. 377, 400 n. 28 (1956).

Bain's findings have been confirmed by subsequent studies. In a study of concentration and rates of return in 30 industries for the period 1950-60, H.M. Mann found "that there is a distinct cleavage between the average profit rates of two groups of industries, divided according to whether the concentration ratio for the top eight firms is greater or less than 70 per cent." Mann, Seller Concentration, Barriers to Entry, and Rates of Return in Thirty Industries, 1950-60, 48 Rev. of Econ. & Statistics 296, 298 (1966). Accord, Collins & Preston, Concentration and Price-Cost Margins in Manufacturing Industries 33 (1970).

These economic studies suggest that the degree of concentration that should be required in order to establish the prima facie case spoken of by the Supreme Court in Marine Bancorporation is 70 per cent for the top eight firms, as it is that level of concentration which economists have found to be associated with particular high levels of profit.[1/] Moreover, choice of this figure would have the virtue of consistency with all of the potential competition cases decided by the Supreme Court to date, all of which involved levels of concentration markedly higher than that present in the industrial gas industry, as demonstrated by the following chart:

1/ One commentator has suggested 60 percent for the top four firms. See Fox, Toehold Acquisitions, Potential Toehold Acquisitions, and Section 7 of the Clayton Act, 42 Antitrust L.J. 573, 580 (1974).

POTENTIAL COMPETITION CASES
DECIDED BY THE SUPREME COURT

Percent of Market Accounted for by
Firms in the Target Market

	two largest	three largest	four largest	six largest	seven largest	eight largest
Marine Bancorp. 1/		92%				
Falstaff 2/			61.3%			81.2%
Ford-Autolite 3/		96%				
Clorox 4/	65%			80%		
Phillips Petroleum 5/			61%		83%	
Penn-Olin 6/	over 90%	over 99%				

1/ United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5218.

2/ United States v. Falstaff Brewing Corp., 410 U.S. 526, 527-28 (1973).

3/ Ford Motor Co. v. United States, 405 U.S. 562 (1972), aff'g, 286 F. Supp. 407, 419 n. 25, 435 (E.D. Mich. 1968).

4/ FTC v. Proctor & Gamble Co., 386 U.S. 568, 571 (1967).

5/ United States v. Phillips Petroleum Co., 367 F. Supp. 1227, 1251-52 (C.D. Cal. 1973), aff'd without opinion, 42 U.S.L.W. 3709 (U.S. July 8, 1974).

6/ United States v. Penn-Olin Co., 378 U.S. 158, 163-64 (1964).

Use of the 70 percent figure would also be roughly consistent with the Department of Justice's Merger Guidelines. The Guidelines state that the Department will normally attack any acquisition by "one of the most likely entrants into the market" of

> "(i) any firm with approximately 25% or more of the market;
>
> "(ii) one of the two largest firms in a market in which the shares of the two largest firms amount to approximately 50% or more;
>
> "(iii) one of the four largest firms in a market in which the shares of the eight largest firms amount to approximately 75% or more, providing the merging firm's share of the market amounts to approximately 10% or more; or
>
> "(iv) one of the eight largest firms in a market in which the shares of these firms amount to approximately 75% or more, provided either (A) the merging firm's share of the market is not insubstantial and there are no more than one or two likely entrants into the market, or (B) the merging firm is a rapidly growing firm."
> 1 CCH Trade Reg. Rep. ¶ 4510, at 6888.

The Department of Justice's Merger Guidelines demonstrate that the Justice Department would not have regarded this acquisition as subject to attack.

Subparagraph (i) of the Guidelines is inapplicable here because Airco's share of the market, no matter how computed,

does not remotely approach 25%. Subparagraph (ii) is inapplicable because Airco is not one of the two largest firms in the market and because the shares of the two largest firms -- Union Carbide and Air Products -- do not amount to 50%. Subparagraph (iii) does not apply because the shares of the eight largest firms in the industrial gas industry amount to only 51.9%, nowhere near 75%, and because Airco's share of the market is less than 10%. Subparagraph (iv) does not apply because the shares of the eight largest firms in the industry do not amount to 75%, because there are more than one or two likely entrants into the market, assuming that BOC is so regarded, and because Airco, rather than growing rapidly, has declined relative to its competition.

Hence, irrespective of whether the 70% figure suggested here or the Department of Justice's Merger Guidelines is ultimately accepted by the Supreme Court, complaint counsel have failed to make the necessary showing. As we have seen, concentration in the industrial gas industry does not reach the 70% level for the top eight firms.

B. In any Event, the Industrial Gas Industry Is "Genuinely Competitive" and the Doctrine Therefore Inapplicable

Even if complaint counsel, by their use of concentration ratios, have made out a prima facie case for application of the doctrine of potential competition, the evidence in this record is more than sufficient to demonstrate the competitive nature of the industrial gas industry and thereby to rebut that showing.

The principal factors used in evaluating competition are prices and profit margins, the theory being that high profit levels tend to indicate the existence of monopolistic or oligopolistic practices. See, e.g., Brief for the United States at 62-63, United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210; Bain, Price Theory 203-205, 340 (1952); Mason, Economic Concentration and the Monopoly Problem 367-68 (1957). Other relevant factors include capacity-output relationships, level of selling expenditures, and the existence of product and process innovation. Mason, supra, at 354, 367-68.

As the proposed findings of fact demonstrate, the gas industry has been marked by intense price competition for many years. Prices have steadily declined, keeping pace with economies of scale. Only recently have prices firmed, and recent

increases have not kept pace with inflation and increased costs. Moreover, the record demonstrates that price increases by Union Carbide, the largest firm in the industry, have not necessarily been followed, thereby excluding price leadership.

This price competition is encouraged by the fact that the industry's high fixed cost structure tends to lead to price cutting and severe price competition. Moreover, other structural factors -- notably the threat of further backward integration by tonnage users and the great economic power and concentration of the principal customers of the gas industry, place a firm limit on pricing.

The evidence of intense price competition is fully consistent with the historically poor profitability of the industrial gas companies. Rather than having "profits continually and substantially higher than in other industries",[1/] the industrial gas companies have seldom had returns on stockholders' equity as high as the FTC indices for all chemical companies or all manufacturing companies. In the entire period from 1963 through 1973, only two of the publicly-held gas companies ever achieved a return on total invested capital as high as 10% -- Chemetron once and Union Carbide four times. No company has reached that figure since 1967.

1/ Mason, Economic Concentration and the Monopoly Problem, 368 (1957).

Finally, the evidence indicates that the profitability of the industrial gas portions of the businesses of these diversified companies is considerably lower than the consolidated financials would indicate. Thus, this is hardly an industry characterized by excessive profitability. See United States v. Aluminum Co. of America, 148 F.2d 416, 426-27 (2d Cir. 1945).

The other relevant factors also point to a highly competitive industry. The industry has often been plagued by overcapacity and excess product. There has been competition in innovation. While product innovation is impossible, as it is literally impossible to improve on a chemical element such as oxygen, process and application improvements have been notable. The companies compete vigorously in developing new applications for their products, as evidenced by recent developments in oxygen treatment of waste water. Moreover, the companies have continuously built new production facilities to take advantage of economies of scale and have retired obsolete equipment. Finally, the industry is one in which advertising plays no significant role. Hence, it is not characterized by excessive and unproductive selling expenditures.

In Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5218, the Supreme Court indicated that the doctrine of potential competition is inapplicable unless "there are

dominant participants in the target market engaging in interdependent or parallel behavior and with the capacity effectively to determine price and total output of goods or services." Here it is plain that dominant participants in the industrial gas industry are unable to determine either price or output. Rather, the record specifically demonstrates that vigorous price competition exists in the industry, with price increases by Union Carbide, the industry's largest firm, not necessarily paralleled. Excessive profits indicative of monopolistic or oligopolistic pricing are absent. And the industry has frequently experienced product surpluses and excess capacity, thereby demonstrating an inability to limit output in order to raise prices. Hence, under the Marine Bancorporation test, the doctrine of potential competition does not apply to the industrial gas industry.

IV

THIS ACQUISITION DOES NOT VIOLATE SECTION 7 EVEN IF BOC WERE AN ACTUAL POTENTIAL ENTRANT WHOSE ENTRY WOULD HAVE BEEN LIKELY TO LEAD TO SIGNIFICANT PRO-COMPETITIVE EFFECTS

Apart from the failure to prove that BOC was an actual potential entrant whose entry would have been likely to have significant pro-competitive effects, there is a more basic problem with that theory. Assuming arguendo that, had BOC not acquired an interest in Airco, it probably would have entered the United States industrial gas business on a de novo basis or by means of a toehold acquisition, and assuming further that BOC's potential entry would probably have led to significant pro-competitive effects, this acquisition would still not violate Section 7 of the Clayton Act.

Section 7 provides that an acquisition is unlawful where "the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly." 15 U.S.C. § 18 (1970) (emphasis added). As we have seen, BOC's acquisition of an interest in Airco will not lessen competition: BOC was not a perceived potential entrant exerting a pro-competitive effect on any market. Since "the effect of such acquisition" will not be "to lessen competition, or to tend to create a

monopoly," the acquisition simply does not fall within the terms of the statute.

Complaint counsel may suggest that the acquisition is unlawful despite its lack of any present or foreseeable effect on competition on the theory that, if not for Airco, BOC would have been likely to try de novo or toehold entry -- and thus might have improved competition. But this does not bring the acquisition within the words of Section 7. As Professor Rahl has said:

> "To treat an election not to augment competition as a lessening of competition is a neat trick . . . . It is, however, plainly not authorized by the language of the statute, nor by the philosophy of antitrust which does not affirmatively seek to compel competition." Rahl, Applicability of the Clayton Act to Potential Competition, 12 A.B.A. Section of Antitrust Law 128, 143 (1958).

This conclusion is fully consistent both with the decided cases and with the policy of the Clayton Act.

First, the Supreme Court has explicitly reserved decision on the question of whether an acquisition which is otherwise lawful -- i.e., has no likely anti-competitive effect in and of itself -- can violate Section 7 because it precludes another course of action which might improve competition.

In United States v. Falstaff Brewing Corp., 410 U.S. 526, 537 (1973), the Court stated:

> "We leave for another day the question of the applicability of § 7 to a merger that will leave competition in the marketplace exactly as it was, neither hurt nor helped, and that is challengeable under § 7 only on grounds that the company, could, but did not enter de novo or through 'toe-hold' acquisition and that there is less competition than there would have been had entry been in such a manner."

Most recently in Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5217, the Court again noted that this question has yet to be decided:

> "The Court has not previously resolved whether the potential competition doctrine proscribes a market extension merger solely on the ground that such a merger eliminates the prospect for long-term deconcentration of an oligopolistic market that in theory might result if the acquiring firm were forbidden to enter except through a de novo undertaking or through the acquisition of a small existing entrant (a so-called foothold or toehold acquisition). Falstaff expressly reserved this issue."

All previous potential competition cases which have reached the Court have involved acquisitions which themselves reduced the pre-existing level of competition. In some cases, the acquiring company had been exerting a pro-competitive effect on the market as a perceived potential entrant -- entry by acquisition eliminated this fringe effect and thereby

lessened competition. See Ford Motor Co. v. United States, 405 U.S. 562 (1972); United States v. Penn-Olin Chemical Co., 378 U.S. 158 (1964); United States v. Continental Can Co., 378 U.S. 441 (1964); United States v. El Paso Natural Gas Co., 376 U.S. 651 (1964). In another case, an acquisition by a potential entrant created an immediate lessening of competition because the acquiring company was so large and powerful and the acquiring company already had such a leading position in the relevant market that the acquisition would have entrenched the acquired company's domination. FTC v. Proctor & Gamble Co., 386 U.S. 568 (1967); see United States v. Marine Bancorporation, supra, 42 U.S.L.W. 5210, 5216 n. 23.

But no case has adopted the theory here suggested.

Second, the purpose of Section 7 was not to effect a restructuring of the economy by preventing expanding companies from making acquisitions harmless in themselves in order to put them to the choice of not expanding or expanding in a manner that a court or administrative agency thinks may lead to increased competition. It was simply "to limit future increases in the level of economic concentration resulting from corporate mergers and acquisitions." S. Rep. No. 1775, 81 Cong., 2d Sess. (1950), in 2 1950 U.S. Code Cong. and Ad. News at 4295 (1950) (emphasis added).

V

COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT "INDUSTRIAL GASES" CONSTITUTE A RELEVANT LINE OF COMMERCE UNDER SECTION 7

The complaint here alleges that industrial gases constitute a relevant line of commerce for assessing the effects of BOC's acquisition of an interest in Airco. (Cpt. ¶23) "Industrial gases" are defined as:

> ". . . . gases in compressed, liquid and solid form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof." (Cpt. ¶1(a))

Thus, the complaint seems to allege that all chemical elements and compounds that exist in the gaseous state -- presumably under conditions of standard temperature and pressure -- constitute a relevant line of commerce for purposes of Section 7.

The standards generally applicable in determining the validity of an alleged product market are well established. Brown Shoe suggested that relevant criteria include the peculiar characteristics of the product, the existence of unique production facilities, distinct customers, distinct prices, sensitivity to price changes, specialized vendors

and industry or public recognition of the product as a separate economic entity. Brown Shoe v. United States, 370 U.S. 294, 325 (1962). And Brown Shoe also established the limits of a product market: Chief Justice Warren wrote:

> "The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it." Id. at 325 (footnote omitted).

"Thus, if there is no cross-elasticity of demand between two products or if these products are not regarded as substitutes for one another, they cannot be included within the same product market." 3 Von Kalinowski, Antitrust Laws and Trade Regulation §18.03[1], at 18-24 (1971).

Measured by the Brown Shoe test, "industrial gases", as defined in the complaint, do not constitute an appropriate product market for Section 7 purposes.

First and foremost, the alleged industrial gas market does not satisfy the essential Brown Shoe test -- it sweeps within its confines many separate gases which clearly are not interchangeable of use and as to which there is no conceivable cross-elasticity of demand. Even when sold to the same customer, the gases are sold and used for different purposes. Thus, the alleged market exceeds "the outer boundaries of a product market."

This failure to satisfy the primary requirement of Brown Shoe arises from the unique nature of industrial gases. Complaint counsel have conceded that they are not significantly interchangeable, being almost invariably used for their unique chemical properties. Indeed, drastic consequences would often ensue from attempts to substitute one gas for another.

The other tests suggested in Brown Shoe, tests which were held to be appropriate in defining submarkets within "the outer boundaries of a product market," are also not satisfied here.

The various gases are produced, for the most part, by wholly different processes, each with a different technology and different equipment. The only exceptions are the atmospheric gases, and propane and butane, which may be extracted from natural gas by a process of cryogenic liquefaction and fractional distillation similar to that used in separating air. There is no cross-elasticity of production facilities among any of the gases.[1]

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[1] Even as among the atmospheric gases and between propane and butane, there is no cross-elasticity of production facilities. The production equipment merely extracts these constituents from air and natural gas, respectively, in essentially fixed proportions.

The gases are also sold to distinct customers, with relatively minor exceptions. Most oxygen is sold to steel companies for use in the production of steel, with the remaining customers including those using the gas for welding, cutting and medical purposes. Nitrogen, on the other hand, is sold primarily to petroleum, chemical, electronics and food companies. The principal customers for hydrogen include ammonia manufacturers and the space program. The principal consumers of carbon dioxide are bottlers of soft drinks. Acetylene is sold to those in the welding and cutting trade. Nitrous oxide and cyclopropane are sold to the medical and dental professions.

Since the various gases are used for their unique properties and are not interchangeable to any significant extent, it follows logically that there can be no sensitivity to price changes among the different gases.

The differences separating the gases which complaint counsel would lump together under the "industrial gas" rubric are so vast that only two of the Brown Shoe tests are even arguably satisfied: (a) industry or public recognition of the market as a separate economic entity and (b) specialized vendors. But close analysis indicates that even these criteria are not met.

Many witnesses testifying at trial were asked to define the term "industrial gases." While all had definitions to offer, their definitions did not agree -- except that all regarded oxygen, nitrogen, argon and acetylene as industrial gases. But there was at least one witness testifying each way as to whether or not each of the other gases mentioned in the hearing record was an "industrial gas."

Reference to the Census Bureau Standard Industrial Classification Manual, while perhaps relevant, is by no means conclusive. To begin, SIC Code 2813, "industrial gases," is not coextensive with the definition in the complaint. (Compare CX 296-C with Cpt. ¶1(a)) Moreover, as numerous economists have indicated, SIC codes are often unrealistic and unsatisfactory as criteria for defining the areas within which to assess the effects of an acquisition. Professor Mason is typical:

> "Both area and product considerations cast substantial doubt on the validity of using uncorrected census product and industry data in calculating market shares of large firms. Such industry data must be used as a starting point in any empirical study of monopoly and competition, but in many cases, it is necessary to combine or subdivide in order to obtain data usable in effective market analysis." Mason, Economic Concentration and the Monopoly Problem 34 (1957). Accord, Scherer, Industrial Market Structure and Economic Performance 52-53 (1970). See A.G. Spalding & Bros., Inc. v. FTC, 301 F. 2d 585, 604-05 (3d Cir. 1962).

This warning is particularly appropriate here, for Dr. Kridl testified that reconsideration of the SIC codes relating to all chemicals is underway. (Kridl 2141-42) Thus, the Census Bureau classification is not a substitute for consideration of the Brown Shoe criteria.

In light of this confusion, the fact that there are firms regarded as "industrial gas companies" selling varying lines of gases which they refer to as "industrial gases" hardly establishes industry or public recognition of a market, as there is no agreement as to what gases the industry or public is recognizing by use of the terms.

This brings us to the question of specialized vendors. Certainly a great many of the firms which have been referred to in these proposed findings and brief as "industrial gas companies" are engaged in the manufacture and sale of the three principal atmospheric gases -- oxygen, nitrogen and argon -- and acetylene. Beyond that core, however, there is no necessary congruity of product lines. For one of the major products, carbon dioxide, we find that Union Carbide and Air Products -- the two largest firms under SIC Code 2813 ranked according to value of shipments -- are not significant factors, with Union Carbide, the largest, not even marketing the product at all. Similarly, a number of the industrial gas companies market fuel gases while

others do not. Some market rare gases; some do not. Some market nitrous oxide and cyclopropane; some do not. Some are in the helium business; some are not. Moreover, the record demonstrates that for the most part there are no commercial advantages that necessitate marketing of a particular mix of gases. Thus, strength in one gas is not necessarily translatable into strength in another.

Hence, while there are certainly many vendors who specialize in selling gases, their product lines vary so substantially that one cannot properly conclude that they are specialists for any clearly defined line of gases.

Indeed, the "specialist" criterion of Brown Shoe supports the view that the individual gases should be regarded separately for purposes of Section 7. Certainly the industrial gas companies prominent in the carbon dioxide business regard that as a completely separate field of endeavor. Two of the three top companies operate their carbon dioxide businesses from totally separate divisions and the third employs a separate marketing staff. Moreover, the evidence indicates that the industrial gas companies employ specialized sales staffs for the different gases and even for marketing the same gases to tonnage and merchant customers.

The only case which we have found that involved a product market definition issue like the one at bar -- one involving different chemical compounds that were not significantly interchangeable -- supports the view that the broad alleged market of "industrial gases" is not a relevant line of commerce for Section 7 purposes.

In Union Carbide Corp., 59 F.T.C. 614 (1961), the issue was whether polyethylene resin sold for film extrusion and polyethylene resins in general were in the same market. The Hearing Examiner found that all polyethylene resins, including those sold for film extrusion, were thermoplastic materials of similar chemical characteristics and made by essentially the same manufacturing process. 59 F.T.C. at 628-29. The only difference between the film extrusion resins and the basic resins was that the former had certain additives not found in the latter, although the additives did not change the chemical composition of the resins. Id. at 631. Moreover, basic resins were used for film extrusion "without the addition of additives" although the examiner found that "by far the greater amount of resins sold for film extrusion is specifically selected and compounded." Ibid.

Based on the peculiar characteristics and uses of film-grade polyethylene resins, their distinct prices, and the use of "highly-trained salesmen who 'know how these materials act in his [the customer's] particular end use'", the Hearing Examiner held that film extrusion polyethylene

resins constituted a relevant product market separate from polyethylene resins in general. Id. at 632.

The full Commission sustained that holding, relying particularly on the facts that film extrusion resins contained additives specially adapting them for film use and were more difficult to produce, and that "producers occasionally change prices on film-grade resins without changing the prices of others." 59 F.T.C. at 650-51.

This case is a far stronger one for disallowing a broad product market than Union Carbide. Here we are dealing with many gases, almost all of which are produced by widely differing processes and none of which have common chemical characteristics. In Union Carbide, on the other hand, the Commission was faced with only polyethylene resin and polyethylene resin with additives, both produced by essentially the same process and having essentially the same chemical characteristics. Here there is virtually no interchangeability among the various gases, while in Union Carbide the Hearing Examiner specifically found some degree of substitution. Here the pricing of the gases is almost entirely independent, while in Union Carbide the Commission regarded as highly significant the fact that the price of film-grade resin was "occasionally"

changed without changes in the price of other polyethylene resins. Moreover, here some of the gases are sold by different companies or different divisions of the same company and almost all by different sales staffs, while in Union Carbide it was sufficient that the salesmen for all of the resins needed additional special knowledge with respect to film-grade resins.

In light of Brown Shoe's definition of "the outer boundaries of a product market" and the Commission's decision in Union Carbide, we submit that "industrial gases" are not a relevant line of commerce.

We are aware, of course, of the cases in which so-called "cluster" markets -- markets consisting of several distinct and non-interchangeable items or services -- have been sustained by the courts. E.g., United States v. Ford Motor Company, 286 F. Supp. 407 (E.D. Mich. 1968) (ignition parts), aff'd without consideration of the point, 405 U.S. 562 (1972). However, those cases all involved at least one critical element that is absent here. While the components of the markets recognized in those cases were perhaps not interchangeable, all of the components were sold as a group -- or line -- to the same customers for identical or closely related uses or purposes. For example, while the various

ignition parts in Ford were not interchangeable, the court found that complete lines of ignition parts were marketed as a group to the same customers for use for the sole purpose of starting automobiles. 286 F. Supp. at 413-14. It found that the competing lines were "locked in combat for space on the repairman's shelf." Id. at 412. Thus, the full line of ignition parts constituted the "area of effective competition" due to the identity of customers and the close relationships of the uses for the components of the lines.[1/]

The range of industrial gases involved in this case is not a competitive line in the same sense as the ignition parts in Ford Motor. The most important reason is that they are sold largely to different customers for widely divergent

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1/ The same is true of the athletic goods involved in A. G. Spalding & Bros., Inc. v. FTC, 301 F.2d 585 (3d Cir. 1962). While the particular items of baseball, basketball, golf and tennis equipment involved were not interchangeable with one another, the firms in the industry competed on a line basis because their customers -- sporting goods wholesalers and retailers -- bought full lines of equipment. See Sterling Drug, Inc., 80 F.T.C. 477, 595 n. 19 (1972).

uses. Even where two or more gases are sold to the same customer, there is no necessary interrelationship between the gases.1/ Thus, the buyers of these gases do not generally look to their suppliers to provide a line of interrelated and complementary products, which they assess by comparison with a competing line. They normally look to a supplier to sell one or perhaps two of the many gases involved or, if they are tonnage users, to build a plant to produce a specific gas on a custom basis.

The importance of taking into account the point of view of the buyers of industrial gases is confirmed by the Bethlehem Steel case. There the Court said:

> "The definition of a line of commerce in a section 7 case is formulated for the purpose of determining the impact of a merger on competition. Competition is not just rivalry among sellers. It is rivalry for the custom of buyers. Also in many instances, and particularly in the steel industry, it is, during periods of shortage, strongly present as rivalry among buyers for sources of supply. Thus competitive forces may move in a number of directions -- buyer against buyer; seller against seller; buyer against seller. But however competition is defined and whatever its form or intensity, it always involves

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1/ This is not universally true. Certainly there is a relationship between oxygen and acetylene when sold to the welding trade for joint use in welding. Similarly, oxygen, nitrous oxide and cyclopropane are interrelated when sold to hospitals for use in anesthesia, but these are minor exceptions to a contrary pattern and are not relied upon by complaint counsel.

> interplay among and between both buyers and sellers. Any definition of line of commerce which ignores the buyers and focuses on what the sellers do, or theoretically can do, is not meaningful." United States v. Bethlehem Steel Corp., 168 F. Supp. 576, 592 (S.D.N.Y. 1958) cited with approval in United States v. Brown Shoe Co., 370 U.S. 294, 322, 324-26, 332, 336, 343, 345, 367 (1962).

Hence, the critical differences in the buyers' situations between this case and those in which cluster markets have been upheld is quite significant. It means that the areas of "effective competition" are different. The competition is on a line basis in the cluster cases and on a gas basis here.

The Commission has recently adopted this analysis in the Sterling Drug case. Sterling Drug, Inc., 80 F.T.C. 477 (1972). There complaint counsel sought to establish a product market, called "health and beauty aids," consisting of a broad range of distinct items. In rejecting that alleged market, the Commission held the fact that health aids, on the one hand, and beauty aids, on the other, were marketed by similar methods to similar retail outlets was not dispositive. It distinguished the cases approving cluster markets, saying that:

> "[I]n those cases it was established or undisputed that resource flexibility existed or that the product groupings were sold as a full line by most firms." 80 F.T.C. 477, 595 n. 19.

Hence, the Commission recognized that the relevant inquiry is not whether it is possible to find some generic description such as "industrial gases" or "health and beauty aids" for a group of dissimilar products, but whether a definable line of products constitutes the effective area of competition at the relevant level of distribution.

This analysis is also fully consistent with the commercial banking cases decided by the Supreme Court.[1/] See Sterling Drug, Inc., 80 F.T.C. 477, 595 n. 19 (1972). There the Court has held that the cluster of services offered by commercial banks -- demand deposits, time deposits, loans and the like -- constitute a distinct line of commerce for Section 7 purposes. But the Court's holding has been premised on the fact that a number of critical factors -- including that unique factor of commercial banks, the acceptance of demand deposits, as well as "settled consumer preferences" -- have

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1/ E.g., United States v. Connecticut National Bank, 42 U.S.L.W. 5226 (U.S. June 26, 1974); United States v. Philadelphia National Bank, 374 U.S. 321 (1963).

insulated commercial banks from effective competition across the full line of their services. See United States v. Philadelphia National Bank, 374 U.S. 321, 356-57, 326 (1963); cf. United States v. Connecticut National Bank, 42 U.S.L.W. 5226, 5229 (U.S. June 26, 1974).

In sum, "industrial gases" as defined in the complaint are beyond "the outer boundaries of a product market" as defined by Brown Shoe and, in any event, do not satisfy the Brown Shoe criteria. Moreover, such a market definition would be so broad as to neglect the competitive reality that the "effective area of competition" is on the level of individual gases.

It is unnecessary to consider whether some more narrowly defined group of gases could be an appropriate product market under Section 7. At the outset of this case, complaint counsel disavowed reliance on any such narrower market. (74-75) Consistent with that statement, the record contains no evidence with respect either to the propriety of any such market or the competitive effect of this acquisition on such a market.

Accordingly, complaint counsel have failed to prove any relevant line of commerce in this case.

VI

COMPLAINT COUNSEL HAVE FAILED TO IDENTIFY OR PROVE A RELEVANT GEOGRAPHIC MARKET

A determination of the relevant geographic market is "a necessary predicate" to a finding of a violation of Section 7. United States v. Marine Bancorporation, Inc., 42 U.S.L.W. 5210, 5215 (U.S. June 26, 1974). Complaint counsel have failed to establish any relevant geographic market. Accordingly, no violation of the Clayton Act can be found on this record.

The geographic market in a Section 7 case must be determined by looking at the commercial realities of the business in question. In Brown Shoe, the Supreme Court stated:

> "Congress prescribed a pragmatic, factual approach to the definition of the relevant market and not a formal, legalistic one. The geographic market selected must, therefore, both 'correspond to the commercial realities' of the industry and be economically significant." Brown Shoe Co. v. United States, 370 U.S. 294, 336-37 (1962) (footnote omitted).

The commercial reality of the industrial gas industry is that, for most gases, because of transport costs, customers cannot look outside of their immediate geographic area for

sources of supply and suppliers can sell their product 1/ only within the vicinity of their production facilities.

There can be no national market where customers can obtain supply only from nearby production facilities. In Tampa Electric Co. v. Nashville Coal Co., 365 U.S. 320, 327 (1961), the Supreme Court stated that the relevant geographic market "must be charted by careful selection of the market area in which the seller operates, and to which the purchaser can practicably turn for supplies." The significance of where customers turn for alternative sources of supply was also recognized in United States v. Philadelphia National Bank, 374 U.S. 321, 357-62 (1963). There, the Court found that the relevant geographic market for commercial banking was a local four-county area. The Court recognized that, although customers are free to use distant banks, the inconvenience limits the number who do so. And so, the Court held, the market was localized by inconvenience -- just as it would be by high transportation costs:

> "The factor of inconvenience localizes banking competition as effectively as high transportation costs in other industries." Id. at 358.

1/ This applies to gas in merchant quantities. Subject to the limitations imposed by the availability of backup, tonnage supply contracts apparently can be sold throughout the country. But complaint counsel have not contended for a national market in tonnage supply.

Most recently in United States v. Connecticut National Bank, supra, 42 U.S.L.W. 5226, 5230 (U.S. June 26, 1974), the Supreme Court rejected the Government's contention that the State of Connecticut was a relevant geographic market in which to ascertain the effects of a bank merger. Quoting Tampa Electric and Philadelphia National Bank, the Court held:

> "[T]he geographic market must be delineated in a way that takes into account the local nature of the demand for most bank services. It 'must be charted by careful selection of the market area in which the seller operates, and to which the purchaser can practicably turn for [alternatives]'. . . .
>
> "On remand the District Court must determine pursuant to the localized approach denoted above the geographic market in which [The Connecticut National Bank] operates and to which the bulk of its customers may turn for alternative commercial bank services." Id. at 5230 (citations omitted).

Equally relevant here is United States v. Penn-Olin Chemical Co., 217 F.Supp. 110(D. Del. 1963), vacated on other grounds, 378 U.S. 158 (1964). There, the Government challenged a joint venture which Pennsalt and Olin Mathieson had established to produce and sell sodium chlorate from a plant to be built in Kentucky. At the time the joint venture was launched, only three companies produced sodium chlorate in the United States -- Hooker, which had one plant in New York and one plant in Mississippi; AmPot, which had one plant in Nevada and one plant in Mississippi; and Pennsalt, which had a plant in Oregon.

In considering the Government's claim that the relevant geographic market was the entire country, the Court said:

> "Of foremost importance in determining whether there was a nationwide relevant market is the question whether western shippers could compete effectively in the southeast, and southeastern producers could compete effectively in the 11 western states. Unless they could, there was no relevant national market." Id. at 120.

The Court found that transportation cost made it impossible to sell sodium chlorate across the country. After observing that "[a] competitive price disadvantage arising from transportation costs is an important factor in determining the scope of a relevant market," the Court rejected the alleged national market. Id. at 120-23.

High transportation costs have required findings of local geographic markets in other cases. Erie Sand & Gravel Co. v. FTC, 291 F.2d 279 (3rd Cir. 1961), dealt with geographic market definition in the sand industry. Holding that transportation costs limited geographic markets, the court noted that "the area of effective competition may . . . be limited by differences in costs of . . . transportation," and that "the cost of transporting sand, a heavy and bulky commodity, is such that sellers whose sources of supply are far from a concrete-making operation cannot compete with sellers whose sources are nearby." Id. at

281-84. Similarly, in Luria Brothers & Co. v. FTC, 389 F.2d 847 (3d Cir. 1968), cert. denied, 393 U.S. 829 (1968), the court affirmed the FTC's finding of narrow geographic market in the scrap metal industry, stating:

> "The evidence further shows that the Pittsburgh-Youngstown area was the proper section of the country to examine in order to weigh the effect the acquisition would have on commerce. Tampa Electric Co. v. Nashville Coal Co., supra. This is apparent because the mills in that section of the country were supplied by the brokerage houses in the area due to the prohibitive costs of transportation." Id. at 865.

Here, gases in merchant quantities are subject to the same transportation economics as sand, scrap metal and sodium chlorate. Hence, the same considerations dictate rejection of a national market. Indeed, this was recognized some years ago by the United States National Resources Committee, which concluded that the market for compressed and liquified gases -- then the title of the Census classification for what is now industrial gases -- was a local rather than a national market. U.S. National Resources Committee, The Structure of the American Economy 266 (1939).

The conclusion that the entire country cannot be a relevant geographic market becomes even clearer when one bears in mind the purpose for which a geographic market is defined in a Section 7 case: to assess the competitive effect

of the acquisition. Here the claim is twofold: (1) that BOC exerted a fringe effect on the industry by threatening to enter and (2) that actual entry, de novo or toehold, might have improved competition. But the structure of the industry is such that neither of these two possibilities can properly be assessed on a nation-wide basis.

De novo entry or a toehold acquisition would necessarily have meant that BOC would have started out in the industrial gas business in a very small area of the United States. If it had acquired Alabama Oxygen, for example, it would have affected the industry only within a couple of hundred miles of Bessemer, Alabama. Even a de novo entry would have had to start somewhere and could have had an impact on only a limited geographical area. Indeed, it would certainly have been many years before either form of entry could have had an effect on a broad geographical area.

This has significant ramifications for assessing BOC's likely effects as a potential entrant. On the perceived potential entrant theory, industrial gas companies in the United States could only have been affected by a threat of entry if they regarded entry by BOC as likely in their own geographical area. [1/] For example, even if Big Three thought BOC was likely

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1/ As we have seen, only Union Carbide, Air Products and Airco are substantially nationwide in scope.

to enter, it would not have been rational for Big Three to alter its competitive conduct if it thought that the acquisition was likely to be via acquisition of Burdett of Norristown, located thousands of miles away. Similarly, even if an industrial gas company operating in Los Angeles thought de novo entry by BOC to be likely, it would not have thought de novo entry near Los Angeles was likely because atmospheric gases are in over-supply there -- and so it would not have been likely to alter its competitive conduct.

The same analysis applies to the actual potential entrant hypothesis. There is no basis in this record for concluding that BOC could have entered the United States industrial gas industry on a nationwide scale over any reasonably short period of time. Hence, even if one accepts the notion that BOC would have taken such a step, the likely effects of such an entry can only be measured in those particular areas where it was likely to occur.

The foregoing demonstrates that the United States as a whole is not an appropriate geographical area in which to test the probable competitive effects of this acquisition. Since the only evidence received in this proceeding related to the United States as a whole, the complaint should be dismissed.

PART II - MEDICAL EQUIPMENT

Proposed Findings of Fact
as to Medical Equipment

(1)

Definitions

357. "Inhalation anesthetic equipment" is defined in the complaint as equipment and accessories used in the administration of gas for anesthetic purposes. (Cpt. ¶ 1(b))

358. "Inhalation therapy equipment" is defined in the complaint as equipment and accessories used in the administration of gas for therapeutic purposes. (Cpt. ¶ 1(c))

359. "Anesthetic agents" are drugs used to render a patient unconscious, insensitive to pain and immobile during surgical procedures. (Hedley-Whyte 1238, 1197-98). Drugs used for this purpose include barbiturates, nitrous oxide, cyclopropane, Ethrane, ether, and halothane. (Hedley-Whyte 1237, 1246-47; Cosgrove 2288; Giordano 2022.) Some anesthetic agents are gases that are administered directly to the lungs of the patient; others are liquids or in solution; in an anesthesia vaporizer (which operates rather like a carburetor), they are vaporized into a stream of carrier gas and then passed into the patient's lungs. (Hedley-Whyte 1200; and Cosgrove 2288) This

is accomplished by an anesthesia machine, the basic function of which is to regulate the flow of gas and anesthetic agent to the patient. (Schreiber 1053-54) Still other anesthetic agents are administered by injection. (Hedley-Whyte 1237-39)

(2)

Respondents' United States
Medical Equipment Businesses

A. BOC

360. BOC has two United States subsidiaries engaged in aspects of the medical equipment field, Fraser Sweatman, Inc. and Harris Lake, Inc. (Smith 1782-83) In addition, it has formed a holding company known as Medishield, Inc. to coordinate the activities of its North American medical interests. (Smith 1784-85)

1. Harris Lake, Inc.

361. BOC acquired 70% of the stock of Harris Lake, Inc. on November 20, 1973 and the remaining 30% on or about November 28, 1973. (CX 107) Thus, BOC acquired Harris Lake just a few weeks before it acquired its interest in Airco.

362. The Harris Lake acquisition grew out of a thirty-year relationship between BOC and Harris Calorific, a United States

firm in the industrial equipment business. (See Smith 1775) During that period there were licensing arrangements between the two firms concerning light industrial equipment, including welding equipment. (Smith 1775)

363. In 1963, BOC purchased 23% of the stock of Harris Calorific, but took no active part in management. (Smith 1775-76) A year or two later, Harris Calorific became interested in medical equipment and obtained a license from BOC permitting it to assemble and sell in the United States an anesthesia machine owned by BOC, the Boyle table. (Smith 1776-78)

364. In the early 1970s, George Lake, now the president of Harris Lake, was the head of the Foregger Company, a medical equipment firm. When Foregger was acquired by Air Products, Mr. Lake left to become head of the medical business of Harris Calorific under the name of Harris Lake, owned 70% by Harris Calorific and 30% by Mr. Lake. (Smith 1778-79; CX 107; CX 63-B)

365. Harris Lake continued as the medical equipment subsidiary of Harris Calorific until 1973. In the spring of that year, Harris Calorific advised BOC that it intended to sell its business to Emerson Electric. BOC was concerned, as this would have resulted in transfer of the license for the Boyle table to Emerson Electric. After a period of negotiations, Emerson

bought Harris Calorific and that firm's 70% interest in Harris Lake, following which both Emerson and George Lake sold their Harris Lake stock to BOC. BOC paid $2 million for Harris Lake, of which $1.4 million was for goodwill and about $600,000 for tangible assets. (Smith 1778-80)

366. Harris Lake is located in Cleveland, Ohio. It is engaged exclusively in aspects of the medical equipment business; it had gross sales in 1973 of [D 29] (CX 327I) Its principal sales item is the Wright respirometer, which it purchases from BOC. (CX 327C; Cosgrove 2458-59) Its principal "manufactured" item is the Boyle table, which it assembles from various components supplied by others. (Laister 2560-61; CX 327) Its plant, offices and warehouse occupy a total of eight thousand square feet. (Laister 2560-61; BOC RX 1-7) It has about three salesmen. (Laister 2561)

367. BOC has made no changes in the Harris Lake operation since it was acquired in late November 1973. Harris Lake has continued to operate autonomously, controlling its own product line and geographical scope. (Laister 2673-74)

2. Fraser Sweatman, Inc.

368. Fraser Sweatman, Inc. is a United States subsidiary of a British company, Cyprane, Ltd., which manufactures anesthesia vaporizers. (Smith 1780-82)

369. In 1972, BOC became interested in purchasing the British operations of Cyprane, because BOC was buying a large portion of Cyprane's vaporizer output for use with BOC's anesthesia machines. (Smith 1780-81) BOC sought to buy only the British company and perhaps a small interest in Fraser Sweatman, Inc. and Fraser Sweatman (Canada), Cyprane's Canadian subsidiary. (Smith 1781-82) But when Chemetron and G. D. Searle, a large United States pharmaceutical company, also expressed interest, all three firms were asked to submit sealed bids for the entire Cyprane business, including Fraser Sweatman (Canada) and Fraser Sweatman, Inc. BOC was the successful bidder and in 1972 it acquired Fraser Sweatman, Inc. as part of the package. (Smith 1782)

370. Fraser Sweatman is located in Lancaster, New York. Its principal businesses are the sale and servicing of Cyprane vaporizers which it imports from Cyprane, Ltd., and the manufacture and sale of analgesia machines for dental use. (CX 327) In 1973 its total sales were [D 30] , of which [D 31] was attributable to these activities. (CX 327) Fraser Sweatman has been losing money since before it was acquired by BOC. (Laister 2675)

371. Fraser Sweatman's sole facility is an assembly shop even smaller than Harris Lake's. (Smith 1781; BOC RX 8-20; Laister 2686-87) When Fraser Sweatman was acquired by BOC, it had three or four salesmen. (Laister 2562) Subsequently it has added about four more to develop sales of prosthetics. (Laister 2562)

372. BOC has not made significant changes in Fraser Sweatman's operation since the 1972 acquisition. The firm is operated autonomously of London. (Laister 2673-74, 2686)

3. Medishield, Inc.

373. BOC recently formed Medishield, Ltd. in the United Kingdom as a holding company designed to collect the medical interests of BOC around the world. Medishield, Inc. was formed as a United States subsidiary of Medishield, Ltd., to coordinate BOC's United States and Canadian medical activities -- Fraser Sweatman (Canada), Fraser Sweatman, Inc., Harris Lake, and the medical equipment business of Canox. (Smith 1784-85)

B. Airco -- Ohio Medical Products Division

374. Airco's medical business is carried out through its Ohio Medical Products Division. (RAX 7, pp. 14-17)

375. Ohio sells a broad range of products of interest to the medical profession, including human anesthesia equipment and accessories, respiratory care products, primary medical pipeline equipment, secondary medical pipeline equipment, electrosystem walls, neonatal care equipment, therapy oxygen, medical gases and anesthetic agents. Ohio's total U.S. sales of all products in 1973 were about $47 million. (Cosgrove 2282-83)

(3)

Are Inhalation Anesthetic Equipment
And Inhalation Therapy Equipment
Relevant Product Markets?

A. Inhalation Anesthetic Equipment and Accessories

1. The Products.

376. Evidence was received here relating to a large array of separate products related in greater or lesser degree to the process of anesthetizing a patient. The most convenient way to discuss these products is first to consider the particular products listed in the specifications to a subpoena served on third parties by complaint counsel (CX 316-A), since much of the data concerning sales and manufacturers are organized in accordance with those specifications. We shall then pass to other products.

Listed by Complaint Counsel

377. Complaint counsel's subpoena lists:

(a) Anesthesia vaporizers. These are small metal or glass containers which convert a liquid anesthetic agent into vapor, combine it with a stream of carrier gas, and aid in regulating the concentration of the anesthetic agent in

the gas delivered to the patient. (Schreiber 1054, Cosgrove 2288) There are several types of anesthesia vaporizers:

(1) Bubble-through ether vaporizers -- essentially glass bottles that hold liquid ether. A carrier gas is bubbled through the liquid, picking up ether for administration to the patient.

(2) Wick vaporizers, in which gas is passed across a wick that is saturated with a liquid anesthetic agent.

(3) Thermally compensated vaporizers, which are designed to maintain close control over the concentration of anesthetic agent in the gas stream.

(4) Tec-type vaporizers. (Cosgrove 2299-2308)

Only tec-type vaporizers are drug-specific, i.e., they may safely be used with only one anesthetic agent, whereas the others are adapted to broad-range use. (Hedley-Whyte 1289-92) The production methods employed in manufacturing vaporizers

are relatively simple: they are assembled from such materials as steel tubes, brass castings and glass jars. (Cosgrove 2303-04)

(b) Rebreathing reservoir bags. There are two general systems used for the administration of inhalation anesthetics: rebreathing and non-rebreathing. In the former, some of the gas administered to the patient is recirculated to the patient again and again after carbon dioxide is first removed from the expired gas. In non-rebreathing systems, all the gas administered to the patient is fresh, and the patient's exhalations are not recirculated to him. (Schreiber 1055; Cosgrove 2320; Hedley-Whyte 1200) The rebreathing reservoir bag is a latex rubber bag, the function of which is to collect the expired gas from a patient in a rebreathing system. (Cosgrove 2320; Schreiber 1055; Hedley-Whyte 1200)

(c) Anesthesia conducting tubes. These carry the gas from the anesthesia machine to the patient. They are corrugated, flexible tubes which may be either disposable or reusable. Typically, the reusable tubes are rubber and the disposable tubes are plastic. (Cosgrove 2321; Schreiber 1055-56)

(d) Anesthesia airways: small curved tubes that are inserted into the patient's mouth in order to prevent

him from biting endotracheal tubes that are inserted into the trachea. (Hedley-Whyte 1202) They are made of either rubber or plastic; there is no special or unusual technology involved in their manufacture. (Cosgrove 2323)

(e) Anesthesia face masks: used to conduct gas from the anesthesia conducting tube directly to the patient's nose and mouth, typically at the start and end of anesthesia procedures. Both disposable and reusable models are available, the disposable being made of plastic and the reusable of latex rubber. (Cosgrove 2323-24; Schreiber 1056-57; Hedley-Whyte 1202-03)

(f) Connecting Y-pieces. In rebreathing systems, two conducting tubes lead from the anesthesia machine to the patient. One conducts fresh gas from the machine to the patient and the other carries the exhaled gas back to the machine. The Y-piece is a small rubber fitting that connects these two conducting tubes to the face mask. (Cosgrove 2325; Schreiber 1056-57; Hedley-Whyte 1203)

(g) Adapters and fittings. Y-pieces typically have an inside diameter connection of 15 millimeters while older face masks often have 22 millimeter diameter connections. Adapters are used to connect these older type masks to the 15-millimeter Y-pieces. (Schreiber 1057-58)

(h) Carbon dioxide absorption cannisters. In rebreathing systems, it is necessary to remove carbon dioxide from gas exhaled by the patient before recirculating the gas. Hence, anesthesia machines are normally equipped with a plastic and metal cannister which contains a chemical compound, called an absorbant, that absorbs carbon dioxide from the exhaled gas before it is recirculated. (Schreiber 1058; Hedley-Whyte 1203-04) The absorption cannister is made from polypropylene plastic and steel castings obtained from ordinary foundries. (Cosgrove 2297-98) The absorbants are manufactured by chemical companies. (Kuehn 1172-74)

(i) Flow meters are used to control the flow of gas to the patient during anesthesia. They consist of essentially three components: glass tubing, small aluminum floats, and associated scales. These components are freely available; the technology and equipment employed in manufacture is neither complex nor rare. (Cosgrove 2293-94, 2287)

(j) Carts. Anesthesia carts are used to support drugs and equipment that may be needed in the operating room during an anesthesia procedure. (Hedley-Whyte 1204)

(k) Yokes, handscrews and valves. Yokes are brass forgings that are machined and plated using ordinary machine shop equipment. They are used to attach gas cylinders to an

anesthesia machine. (Cosgrove 2292; Schreiber 1059) There is no significant evidence in the record with respect to handscrews and valves.

(l) Anesthesia ventilators: devices which mechanically assist and control a patient's breathing during anesthesia. (Schreiber 1059; Hedley-Whyte 1205-06)

(m) Anesthesia respirometers. These measure the respiratory minute volume, i.e., the total volume of air breathed in one minute by a breathing patient. (Schreiber 1059; Cosgrove 2328-29) This data is of value because it is an indication of the level of anesthesia, i.e., the level of unconsciousness, of the patient. (Schreiber 1059)

(n) Endotracheal tubes. Endotracheal tubes are long tubes inserted into the patient's trachea to keep the patient's airway free. They are connected to the anesthesia machine via the conducting tubes and conduct air or the anesthetic mixture into the patient's respiratory system. (Cosgrove 2328; Hedley-Whyte 1206-07; Schreiber 1060)

(o) Anesthesia machines. The essential elements of an anesthesia machine are:

A cabinet which provides a framework for the other equipment;

Yoke arrangements, which hold cylinders of compressed gases used in administering anesthesia;

Regulators, which control the pressure at which gas is used from the cylinders;

Needle valves and flow meters, which permit the physician to control the flow of gas to the patient with great accuracy;

One or more vaporizers, which perform the function of vaporizing liquid or dissolved anesthetic agents into a stream of carrier gas at a prescribed concentration;

Conducting tubes, which carry the gas and anesthesic agent from the anesthesia machine to the face mask;

A face mask, which is used for conducting the gas and anesthesic agent into the patient's nose and mouth from the anesthesia machine;

Rebreathing reservoir bags, which receive exhaled gas from the patient; and

Carbon dioxide absorbers, which receive exhaled gas from the patient and remove carbon dioxide from it by a chemical process, thereby permitting recirculation of the gas to the patient. (Cosgrove 2284-2311)

There are anesthesia machines specially designed and built for both human and veterinary use. (Hedley-Whyte 1249-50; Schreiber 1093-96; CX 147)

Added by Companies Responding.

378. Complaint counsel's subpoena specifications also included a category entitled "other" in which some of the respondents listed products not specifically mentioned in the specifications. These products were:

(p) LTA kits: used for topically anesthetizing the larynx and trachea prior to insertion of an endotracheal tube. (CX 326-G)

(q) Endotracheal cuffs. (CX 326-Z-9)

(r) Anesthesia extension tubes. (CX 326-I)

(s) Disposable mouthpieces. (CX 329-F)

(t) Popoffs. (CX 329-F)

(u) Rubber valves. (CX 329-F)

(v) Cuff spreader. (CX 329-F)

(w) Tube benders. (CX 329-F)

(x) Rahn samplers. (CX 329-F)

(y) CO_2 analyzers. (CX 329-F)

(z) Dome valves. (CX 329-F)

(aa) Gas evacuators. (CX 329-F)

(bb) Hook rings. (CX 329-F)

(cc) Buccal masks. (CX 329-F)

(dd) Baralyme: a carbon dioxide absorbant used in absorption cannisters. (Kuehn 1130-40, 1172-73; CX 316-D)

(ee) Dental analgesia equipment: includes devices used for mixing nitrous oxide and administering it to dental patients for the performance of dental operations. (Kuehn 1130-40; Porter 1297-98; CX 148)

(ff) Bite block stillettes. (CX 326-Z-13)

(gg) Retractor system. (CX 326-Z-16)

(hh) Controller assister. (CX 329-H, J)

(ii) IPPB Equipment. (CX 329-H, J)

(jj) Accessories for anesthesia ventilators. (CX 320-D)

(kk) Alarms and monitoring devices other than respirometers. (CX 314-D; CX 317-B; CX 317-E)

(ll) Anesthesia breathing circuits. (CX 326-Z-49)

In recent years various firms have begun manufacturing disposable anesthesia breathing circuits consisting of corrugated conducting tubing, the Y-piece, the breathing bag and a filter. These disposable breathing circuits reduce the risk of contamination between patients using the same anesthesia equipment. The breathing bags are rubber, the tubing is polyethylene and the housing for the filter is made of polyvinyl chloride. The entire group of equipment is manufactured using standard plastic and rubber technology. (Cosgrove 2350-55)

(mm) Laryngoscopes. (CX 317-B) Direct laryngoscopes are small metal devices containing a light which permits the anesthesiologist to view the area behind the patient's tongue in order to faciliate insertion of endotracheal tubes through the voice box. (Hedley-Whyte 1207-08)

Mentioned in Hearings but not in Subpoena Responses

379. Apart from the products specified in complaint counsel's subpoena and those identified by respondents to that subpoena, still other products related to the administration of anesthesia were identified during the hearing, including:

(nn) Esophageal stethoscopes. These are specially designed stethoscopes designed for insertion into the esophagus during anesthesia to facilitate the anesthesiologist's listening for heart sounds. (Cosgrove 2329-31)

(oo) Forceps. Forceps are used by anesthesiologists to aid in the insertion of endotracheal tubes. (Cosgrove 2331)

(pp) Analyzer vaporizer controllers (AVCs). An AVC is an electronic device introduced into the breathing circuit of the patient. It analyzes the chemical content of the gases within the circuit and automatically adjusts the amount of anesthetic vaporized into the circuit in order to maintain a fixed concentration. (Cosgrove 2332-33)

(qq) Gas chromatographs; used to measure the concentrations of anesthetic agents in a patient's blood. This provides the anesthesiologist with information as to the level of anesthesia in the blood and therefore the depth of anesthesia. (Cosgrove 2334-39)

(rr) Mayo analyzers. The Mayo analyzer, like the analyzer portion of the AVC, determines the concentration of the anesthetic agents in a sample of gas. (Cosgrove 2338-39) This enables the anesthesiologist to make certain that proper amounts of anesthetic agents are administered.

(ss) Oxygen analyzers: a device used by the anesthesiologist to determine the concentration of oxygen in the breathing circuit. (Cosgrove 2341-43)

(tt) Aspiration and suction equipment. Aspiration and suction equipment are devices employing suction to remove obstructions from the patient's airways. There are three types of such equipment: (1) a suction device or aspirator which is an integral part of the anesthesia machine; (2) portable suction equipment and (3) suction provided via wall outlets. (Cosgrove 2344-47)

(uu) Polarographs. A polarograph is another device used for determining the concentration of oxygen in the gas being administered to the patient. (Hedley-Whyte 1251-55)

(vv) Blood pressure measuring devices. The blood

pressure of the patient is monitored by the anesthesiologist in 90% of all anesthetic procedures. (Hedley-Whyte 1258-59) Numerous types of equipment are used, several of which are sold as accessories to anesthesia machines. (Cosgrove 2360) The most common device is the ordinary blood pressure cuff. However, other devices, including devices measuring intra-arterial blood pressure, are also used. (Hedley-Whyte 1256-59)

(ww) Electrocardiographs. Anesthesiologists use an electrocardiograph in a majority of anesthetic procedures to assess the cardiovascular status of the patient and, on occasion, to obtain information regarding the patient's level of anesthesia. (Hedley-Whyte 1261-62)

(xx) Blood oxygenators. A blood oxygenator is a device which substitutes for the patient's lungs and heart during certain surgery. The machine oxygenates the blood and also introduces the anesthetic agent directly into the blood. Thus, the blood oxygenator is used for the administration of gas for anesthetic purposes. (Cosgrove 2367-68)

2. Product Interchangeability.

380. While all of the products listed in the preceding section are related in one way or another to the administration of anesthesia and the care of anesthetized patients, the products

for the most part are not interchangeable. As Mr. Cosgrove, Executive Vice President of Ohio, testified, "[t]hey each have a very specific function." (Cosgrove 2372-73) It is obvious, for example, that a vaporizer cannot be substituted for a face mask, or a rebreathing bag for a carbon dioxide absorber, or a flow meter for a respirometer.

381. There are a few exceptions to this generalization. Reusable and disposable endotracheal tubes are substitutable for one another, as are reusable and disposable face masks and conducting tubes, respectively. Moreover, while there was no specific testimony on this point, it is reasonable to infer from their related functions that there may be a small degree of interchangeability among AVCs, gas chromatographs, Mayo analyzers, respirometers, and oxygen analyzers.

382. Dental analgesia equipment -- nitrous oxide sedation devices -- and veterinary anesthesia equipment are not interchangeable as a practical matter with surgical anesthesia equipment used on humans. (Hedley-Whyte 1248-50)

3. Prices and Price Sensitivity.

383. The prices at which the products discussed above are sold are quite distinct from one another except insofar as one piece of equipment -- the anesthesia machine -- is assembled

from several components. (CX A [price list]; see Cosgrove 2373, 2486-87) And with the same qualification, there is no price sensitivity among those products, i.e., there is no relationship between the pricing of and demand for endotracheal tubes, and, for example, vaporizers. (Cosgrove 2373)

384. Specifically, there is no price sensitivity or cross-elasticity of demand as between surgical anesthesia equipment for humans, dental anesthesia equipment and veterinary anesthesia equipment. (Schreiber 1093-96; Hedley-Whyte 1248-50)

4. Production Processes and Equipment.

385. The products discussed above are produced by a broad range of production processes and equipment which fall into four general areas. First, it appears that similar technology is involved in the production of rubber goods: rebreathing bags, reusable tubes, airway, reusable face masks and reusable endotracheal tubes. Second, it appears that the plastic goods -- essentially the disposable products -- are also produced by related processes. Third, the "hardware" -- vaporizers, flow meters, carbon dioxide absorbers, ventilators and other items -- are manufactured by standard methods and equipment used in metal fabrication, including ordinary machine shop tools and

skills and the skills and equipment of the metal foundry. Finally, some of the metering and monitoring equipment -- including polarographs, analyzers, and respirometers -- apparently require production methods and skills of the electronics industry.

386. It is reasonable to infer that there is some cross-elasticity of production facilities among certain rubber products, plastic products, hardware, and electronic products, respectively, but none whatsoever across those categories.

5. Specialization in Manufacturing and Distribution.

387. This subject is discussed in the section of these proposed findings dealing with the structure of the industry.

B. Inhalation Therapy Equipment and Accessories

1. The Products.

388. Many distinct products are related to respiratory or inhalation therapy. We may best begin by describing the nature of respiratory and inhalation therapy and then consider the particular products listed in the specifications to complaint counsel's third party subpoena. (CX 316-B)

389. Respiratory therapy includes all methods used to assist a patient with insufficient spontaneous breathing to respirate and ventilate. It includes the administration of oxygen, carbon dioxide and helium, the use of aerosols and nebulizers to provide humidity to the airways, the administration of medications by the use of nebulizers, the use of suction to remove mucus secretions from the airways, physical therapy and breathing exercises, pulmonary function studies and other modes of treatment and diagnosis. (Karpick 1404-06, 1415-16) Inhalation therapy, defined so as to be limited to the administration of gases for therapeutic purposes, is merely a small subsection of the field of respiratory therapy. (Karpick 1415-16, 1431)

Listed by Complaint Counsel

390. The particular products listed on complaint counsel's subpoena specifications are:

(a) Ventilators and respirators. For practical purposes, the terms "ventilators" and "respirators" are synonymous. (Karpick 1389) Both assist a patient in breathing by administering a gas, usually oxygen or air, to the patient under positive pressure; in effect, they force the gas into the patient's lungs. (Matsch 1523-25, 1521; Karpick 1386-88)

(b) Humidifiers and nebulizers. Humidifiers and nebulizers are devices which vaporize water or convert it into fine particles in order to humidify air or oxygen administered to the patient. This prevents the airways from becoming dried out. They are also used to administer drugs by the same process and are used in conjunction with oxygen tents, ventilators and respirators, and IPPB equipment. (Cosgrove 2377) Ordinary room humidifiers are also prescribed by physicians for the same purpose. Hand-held nebulizers are also used to administer drugs. (Cosgrove 2378-79)

(c) Resuscitators. A resuscitator is an emergency device used for the immediate establishment of a breathing pattern in a person who has stopped breathing. (Karpick 1930)

(d) Inhalation therapy delivery tubing: ordinary plastic tubing used for the administration of gases for therapeutic purposes. (Karpick 1390; CX A, form 1764, pp. 5-6)

(e) Inhalation therapy face masks. These conduct gases to a patient's nose and mouth and exclude room air. (Karpick 1390-91; CX A, form 1764, pp. 2-3)

(f) Inhalation therapy flow meters: devices used to control the rate of flow of gases to the patient. (Karpick 1391; CX A, form 1766)

(g) Nasopharyngeal catheters and cannulae: devices used to convey gases into the patient's nose or nasal passages. (Karpick 1391)

(h) Oropharyngeal airways: plastic or rubber tubes inserted through the mouth and into the pharynx in order to conduct oxygen or compressed air into the airways and to prevent the patient's tongue from obstructing the airways. (Karpick 1391)

(i) Inhalation therapy drain and condensation bottles are bottles attached to ventilators to collect excess humidity from the gas administered to the patient. (Karpick 1391)

(j) Adaptors and fittings. These are self-explanatory.

(k) Yokes, hardscrews and valves. These were described by complaint counsel's expert as "the nuts and bolts . . . that help get all of this together." (Karpick 1392)

(l) Respirometers. The same respirometers that are used for anesthesia are used for inhalation therapy. (Schreiber 1045-50, 1090, 1096)

(m) Bacteria filters: employed in ventilators and respirators to remove bacteria from the air or oxygen administered to the patient. (Karpick 1392)

(n) Tracheotomy tubes -- placed in a surgical incision into the trachea in the lower part of the neck to permit easy access to the airways for the administration of ventilation and for intratracheal suctioning. (Karpick 1392)

(o) Incubators. Some incubators are used to assist pediatric patients in breathing. (Karpick 1392)

Added in the Hearings.

391. In addition to the products specifically listed on complaint counsel's subpoena specifications, numerous other products were identified as related to respiratory care or inhalation therapy:

(p) Oxygen tents. (Fegan 1438; Karpick 1392-93; CX A, forms 9861, 2535, 9715)

(q) IPPB equipment. Intermittent positive pressure breathing devices are machines that administer pressure to the upper airways in order to assist patients in breathing. In addition, they are used for the administration of medications to the patient's bronchia and lungs. There is a wide variety of such equipment on the market, ranging from sophisticated hospital equipment to small hand-operated, hand-used devices. (Karpick 1423-27; Cosgrove 2377-78)

(r) Aspiration and suction equipment. (Karpick 1427; McWhinnie 1572)

(s) Pulmonary function equipment: products used in analyzing the patient's lung function in order to determine the degree of impairment of the lung or the patient's ability to exchange gases in the lung. (Cosgrove 2384) Some of this equipment is described in the hearing transcript. (Cosgrove 2383-84; see also CX A, form 2603)

2. Product Interchangeability.

392. Interchangeability among the products listed above is very limited. (Cosgrove 2390) The only apparent instances are that various hand-held nebulizers including over-the-counter drug store items are interchangeable with certain types of IPPB equipment where the IPPB equipment would be used to nebulize drugs into the patient's airways (Karpick 1423-26, 1409-16), and that disposable and reusable models of

3. Prices and Price Sensitivity.

393. Apart from the disposable and reusable variations of identical products, the record indicates that there is no price sensitivity among the products discussed above. (Cosgrove 2390-92) These products are all sold at distinct prices. (CX A [price list])

4. Production Processes and Equipment.

394. There was no specific testimony offered at the hearing concerning the methods of production for the products listed above. Thus, there is no basis for drawing conclusions as to cross-elasticity of production facilities.

5. Specialization in Manufacturing And Distribution.

395. This subject is discussed in the section of these proposed findings dealing with the structure of the industry.

6. Industry or Public Recognition.

396. The relevant "public" for sales of inhalation therapy equipment is the medical profession. Over the years, the profession has begun to recognize respiratory therapy or respiratory care as a separate speciality. (Karpick 1385-86, 1393-95,

1429-31; Cosgrove 2478-88) There are now respiratory therapy specialists -- paraprofessionals who assist physicians in administering respiratory therapy and who have specialized training. (Karpick 1393-97)

397. This professional recognition of respiratory therapy, however, is not equivalent to recognition of inhalation therapy, as defined in the complaint, as a separate entity. For example, complaint counsel's expert, Dr. Karpick, in explaining why these paraprofessionals had changed their titles from inhalation therapists to respiratory therapists, testified:

> "[I]t became obvious to everyone that inhalation therapy was not the proper term for this group of individuals in that they were dealing more than just with inhalation of various gases and humidity, but they are really responsible for the entire respiratory function of the patient. This does involve intra-tracheal suctioning of the patient, physical therapy, physical rehabilitation; and they are getting involve in the pulmonary function laboratories now." (Karpick 1396. See also Cosgrove 2373-74; Schreiber 1089-90)

And he acknowledged that inhalation therapy is only a small subsection of the respiratory care field, with no medical personnel specializing in it. (Karpick 1416, 1430-32)

398. Similarly, the record does not support a conclusion that the industry recognizes any particular group of products

as "inhalation therapy" equipment. While the Ohio Medical Products catalog contains a section entitled "Inhalation Therapy Apparatus and Accessories," it does not there include incubators, resuscitators, neonatal equipment, respirators, pulmonary function test equipment, and secondary pipeline equipment (itself including nebulizers, humidifiers, resuscitators and suction equipment) -- they appear under separate headings. Moreover, there is disagreement in evidence offered by complaint counsel as to whether monitoring equipment should be classified as inhalation therapy equipment. (Compare CX A, forms 1775, 380, 1766, with Karpick 1387)

(4)

Geographic Market

399. It is undisputed that the relevant section of the country for analyzing the effects of this acquisition with respect to the alleged medical equipment markets is the United States as a whole.

(5)

Structure of the Alleged Markets

A. Inhalation Anesthetic Equipment and Accessories

1. Manufacturing and Importing

400. The field of inhalation anesthetic equipment and accessories is characterized by a large number of manufacturers, both in the United States and abroad.

401. Much of the data in this record concerning manufacturing of this equipment comes from the returns on a third party subpoena served by complaint counsel on 37 companies. (CX 314-15; CX 316-D; CX 317-21; CX 326; CX 329) The relevant data concerning Ohio Medical Products, Fraser Sweatman and Harris Lake was stipulated by the parties. (CX 327; CX 330)

402. Figure 22 lists the 26 firms that the stipulations and subpoena returns establish as having manufactured inhalation anesthetic equipment and accessories and shows the particular items manufactured by each according to the categories contained in complaint counsel's subpoena specifications.

403. The most striking aspect of the structure of the business is that most firms manufacture only a small number

INHALATION ANESTHETIC EQUIPMENT AND ACCESSORIES MANUFACTURED BY COMPANIES RESPONDING TO SUBPOENA - 1973

FIGURE 22

Company	Anesthesia Machines	Anesthesia Vaporizers	Rebreathing Reservoir Bags	Anesthesia Conducting Tubes - Reusable	Anesthesia Conducting Tubes - Disposable	Anesthesia Airways	Anesthesia Face Masks - Reusable	Anesthesia Face Masks - Disposable	Connecting Y Pieces For Face Masks
Abbott Laboratories									
Air Products	X	X	X	X	X	X	X		X
American Hospital Supply					X			X	
Anesthesia Associates									X
C.R. Bard, Inc.									
Becton Dickenson & Co.			X		X				
Bird Corp.									
Chemetron									
Dryden Corp.								X	X
Dupaco	X				X				
J.H. Emerson Co.			X						
International Paper - Davol			X			X			
Isolette									
Minnesota Mining					X	X		X	
Monaghan Co.		X	X	X			X		
National Catheter Corp.									
North American Draeger	X	X					X		
Porter Instruments									
Respiratory Care, Inc.									
Sherwood Medical Ind.									
Dewey & Almy									
Fraser Sweatman	X	X							
Harris Lake	X					X			X
McKesson	X								
Ohio	X	X	X	X	X	X	X		X
Welch Allyn									

Source: CX 314, CX 315, CX 316, CX 317, CX 318, CX 320, CX 321, CX 326, CX 327, CX 329, CX 330

Figure 22 2E7B

Adapters and Fittings	CO^2 Absorption Canisters	Anesthesia Flow Meters	Anesthesia Carts	Yokes, Valves, Handscrews	Anesthesia Ventilators	Anesthesia Respirometers	Endotracheal Tubes - Reusable	Endotracheal Tubes - Disposable	Other
									X
X	X	X		X			X	X	X
								X	X
X	X			X					X
								X	
					X				
									X
X	X								X
X									X
					X				X
							X	X	
X					X				
					X				X
								X	
X	X	X		X		X			X
		X							X
									X
								X	
									X
									X
	X					X			
	X	X			X				X
									X

A 610

of the wide variety of products that may be regarded as inhalation anesthetic equipment. Only two firms can be said to make anything approaching a broad line of products -- Ohio Medical Products and Air Products (Foregger) -- and even those firms do not manufacture complete lines. Ohio makes, for example, no endotracheal tubes. Air Products makes no face masks, ventilators or respirators.

404. Many of the firms make only one or a few of the products. For example, Porter Instruments makes only flow meters, Sherwood Medical Industries makes only disposable endotracheal tubes, Becton Dickinson makes almost nothing but disposable anesthesia conducting tubes, and American Hospital Supply makes only certain disposable products.

405. The third-party subpoena served by complaint counsel was not served on all firms manufacturing or importing products which may be classified as inhalation anesthetic equipment and accessories. In addition to those for which there are sales data in the record, the following firms make or import at least the following products:

Abbott Medical Electronics	Monitoring equipment. (BOC RX 228, p. 86)
Adec	Nitrous oxide units for dental anesthesia. (Porter 1346)

American Optical Co.	Monitoring equipment. (Cosgrove 2364-65; BOC RX 228, p. 88)
Arbrook, Inc.	Temperature monitoring equipment (BOC RX 232, p. 25; BOC RX 228,p. 91)
Bivona Surgical Instruments	Kayman-Wilkinson tubes. (Cosgrove 2397, 2503)
Beckman Instruments	Oxygen analyzers and monitoring equipment. (Cosgrove 2343, 2363-64, 2463; BOC RX 228, p. 90)
Berkshire	Monitoring equipment. (Cosgrove 2363-64)
Bio-Marine	Oxygen analyzers, monitoring equipment and polarographs. (Cosgrove 2343, 2364-65, 2463; Hedley-Whyte 1253-54; BOC RX 232, p. 21)
Burdick	Monitoring equipment. (Cosgrove 2363-64; BOC RX 232, p. 39; BOC RX 228, p. 95)
Cape Waine	Anesthesia ventilators. (Hedley-Whyte 1278-79)
Colby Labs	Blood oxygenators. (Cosgrove 2368)
Concept, Inc.	Blood pressure monitoring devices. (BOC RX 232, p. 13; BOC RX 228, p. 91)
Dallens Instruments	Monitoring equipment. (Cosgrove 2364-65)
Datascope	Monitoring equipment. (Cosgrove 2363-64; BOC RX 232, p. 79)
Dentatron	Nitrous oxide dental analgesia equipment. (Porter 1346; Cosgrove 2357)
Electrodyne	Electrocardiographs, oxygen analyzers, monitoring equipment. (Hedley-Whyte 1262; Cosgrove 2343, 2364-65)

Electronics For Medicine	Electrocardiographs and monitoring equipment. (Hedley-Whyte 1262; Cosgrove 2363-64)
Extracorporeal Medical Specialties, Inc.	Endotracheal tubes, tracheostomy tubes. (BOC RX 228, p. 86; BOC RX 232, p. 47)
Flextube	Disposable anesthesia breathing circuits. (Cosgrove 2352-53)
Franklin	U.K. firm exporting anesthesia face masks into the United States. (Cosgrove 2325)
Eschmann	German firm, exporting anesthesia face masks into the United States. (Cosgrove 2325; BOC RX 228, p. 95)
General Electric	Monitoring equipment. (Cosgrove 2398, 2363-64, 2505; BOC RX 228, p. 90)
Grummann	Operating room consoles, including anesthesia machines. (Cosgrove 2363; BOC RX 228, p. 96)
Hampton Research	Nitrous oxide dental analgesia equipment. (Porter 1346)
Hewlett Packard	Electrocardiographs, gas chromatographs and monitoring equipment. (Hedley-Whyte 1262; Cosgrove 2341, 2364; BOC RX 232, p. 20)
Instrumentation Laboratory, Inc.	Oxygen analyzers and polarographs (Hedley-Whyte 1252; Cosgrove 2463)
LKB Medical	Importers and distributors of Engstrom anesthesia ventilators. (Hedley-Whyte 1278-79; Cosgrove 2327-28, 2505; BOC RX 228, p. 87)
Lexington Instruments	Monitoring equipment and electrocardiographs. (Hedley-Whyte 1262; Cosgrove 2364-65)
Litton Medical Electrdnics	Monitoring equipment for anesthesiologists. (Cosgrove 2400, 2507)

Menen Gray Bache	Monitoring equipment. (Cosgrove 2364-65)
Penlon	Anesthesia vaporizers. (Schreiber 1112; Cosgrove 2308-09)
Radiometer Co.	Polarographs. (Hedley-Whyte 1253)
Robertshaw Controls Co.	Masks, airways and anesthesia breathing circuits. (BOC RX 232, p. 64)
Will Ross	Disposable anesthesia breathing circuits. (Cosgrove 2352-53)
G. D. Searle	Anesthesia ventilators. (Cosgrove 2327-28; BOC RX 228, p. 88)
Shiley Laboratories	Endotracheal tubes, etc. (BOC RX 228, p. 88)
Frank Simmons Co.	Esophageal stethoscopes. (Cosgrove 2329-30)
Sklar & Pilling	Anesthesia forceps. (Cosgrove 2461)
Star Dental	Nitrous oxide dental analgesia equipment. (Cosgrove 2357, 2419)
Statham Instruments	Monitoring equipment. (Cosgrove 2363-2364)
Teledyne Analytical Instruments	Monitoring and measuring devices. (Cosgrove 2401, 2508)
Warne	Disposable anesthesia breathing circuits. (Cosgrove 2352-53; Scott 1373)
Inhalation Therapy Associates	Disposable anesthesia breathing circuits. (Cosgrove 2352-53)
Seiberling Rubber	Rebreathing Bags. (Cosgrove 2441)
Oak Rubber	Rebreathing Bags. (Cosgrove 2441-42)

2. Distribution

406. Inhalation anesthetic equipment and accessories are marketed both directly by manufacturers and through independent

dealers. Ohio Medical Products and North American Draeger market both direct and through dealers, although Draeger's direct marketing is quite limited. (Cosgrove 2387, 2310-11; Schreiber 1060, 1101) Chemetron markets very largely on a direct basis. (Kuehn 1140-41) Other manufacturers market exclusively through dealers. (Cosgrove 2387) Porter Instruments markets all of its products through Chemetron. (Porter 1299-1300)

407. There are two types of dealers handling anesthetic equipment and accessories.

408. First, there are hospital equipment dealers "selling a very broad range of hospital equipment and supplies ranging everywhere from sutures to bandages to anesthesia machines to perhaps monitoring equipment. In other words, a very broad range of products that might be used throughout the hospital as opposed to just the anesthesiologist." (Cosgrove 2369-70)

409. Second, there are dealers specializing in anesthesia equipment. (Cosgrove 2370) These specialized dealers typically carry anesthesia machines, monitoring equipment, respirators, ventilators, a broad range of accessories and such other products as hypothermia equipment. (Ibid.; Schreiber 1063)

410. Dealers often service as well as sell anesthesia machines. (Cosgrove 2515) In fact, there are anesthesia equipment manufacturers who rely on dealers to supply servicing for their equipment. (Ibid.) Almost all of the servicing of Harris

Lake anesthesia machines, for example, is performed by distributors and dealers. (Laister 2563)

411. Veterinary equipment is typically marketed through an entirely different distribution system from human anesthesia equipment. (Hedley-Whyte 1249-50) Ohio Medical Products does not even market its own veterinary anesthetic equipment: Pittman-Moore Division of Johnson & Johnson is Ohio's exclusive distributor for veterinary products. (Cosgrove 2311, 2319-20)

3. New Entrants into the Inhalation Anesthetic Equipment Field

412. Within the past ten years, at least two firms have entered the anesthetic equipment field with anesthesia machines: Dupaco and North American Draeger, and no firm has left the business. (Cosgove 2317, 2516, 2526-27; Schreiber 1076-77, 1079)

413. Entry into the anesthetic equipment and accessories field is not particularly difficult. It is not necessary to manufacture a complete line of all the products in the area, as evidenced by the fact that not a single firm does so and very few market more than a handful. (Cosgrove 2516; Figure 22, supra) While a sales force is necessary (Schreiber 1078), it need not be large. Heavy reliance may be placed on dealers, as

evidenced by the fact that Harris Lake, for example, has only about three salesmen and sells almost exclusively to dealers. Laister 2561-63) Similarly, dealers can provide servicing for anesthesia equipment. (Laister 2563; Cosgrove 2515)

414. Capital requirements for entering the field are not great. North American Draeger successfully entered the business in 1968 with $27,000 in cash and a line of credit amounting to $250,000 over the course of a year. (Schreiber 1076-77) This conclusion is supported by the fact that both Harris Lake and Fraser Sweatman, two established firms, have very modest physical plants. (Laister 2560-61; BOC RX 1-20)

415. Indeed, complaint counsel's witness testified that the major problem in entering the field is to build up the name, image and reputation of the new company. (Schreiber 1079) This is little different from the problem of starting any new business.

4. Concentration and Market Shares

416. Estimating the market shares of the respondents and the concentration in the manufacturing of inhalation anesthetic equipment and accessories is an almost insurmountable problem on this record.

417. First, the data concerning sales of products manufactured by the companies in the field are incomplete and difficult to interpret. Moreover, there is no reliable evidence as to the relative rankings of the firms.

418. Second, and equally important, there is no reliable evidence as to the total sales at the manufacturing level of the equipment and accessories manufactured in or imported into the United States.

(a) Sales of Respondents

419. The domestic net sales for 1973 of products completely or partially manufactured by Ohio Medical Products Division of Airco were as follows:

	1973
Products specifically listed on the subpoena specification[1]	[D 32] [2]
Total, including "other" products	[D 33] [3]

1/ The total for products listed on the subpoena specifications are those for the items listed on CX 330-A and B. The "other" totals include the products listed on CX 330-C and lines 1 and 2 of CX 330-D.

2/ Includes [D 34] of veterinary equipment in 1973.

3/ Includes [D 35] of veterinary equipment in 1973.

420. The Ohio sales of products listed on the subpoena specifications do not include any monitoring or metering equipment -- since Ohio does not make respirometers, the only such equipment listed. In the "total" figure, other monitoring or metering equipment is included -- AVC's and whistle alarms. Sales of these items were [D 36] in 1973. (CX 330-C)

421. The data for Harris Lake's sales of its own manufacture[1/] are:

	1973
Products specifically listed on the subpoena specifications	[D 37]
Total including "other" products	[D 38]

422. Harris Lake's figures include [D 39] for respirometers. Hence, if this item were excluded, Harris Lake's sales of products manufactured by it would be reduced to [D 40] (CX 327, ¶ 8, and CX 327-H)

423. Fraser Sweatman's sales of products manufactured by it cannot conveniently be analyzed in terms of the subpoena specifications. Its sales of such products were:

1/ Harris Lake and Fraser Sweatman figures include BOC-manufactured equipment which they import and resell.

	1973	
Hospital		
anesthesia machines		
anesthesia vaporizers		[D 41]
accessories		
Dental		
analgesia machines		
accessories		
Veterinary		
anesthesia machines		
accessories		
TOTALS		

(CX 327, ¶¶ 1-5 and pp. 6-7, 10)

(b) Sales of Other Firms

424. The only information in the record regarding sales of products manufactured by other firms is the returns on third-party subpoenas served by complaint counsel and admitted into evidence. (CX 314-15; CX 316-D; CX 318; CX 320; CX 321; CX 326; CX 329) The information contained in those returns is incomplete and unreliable for several reasons.

425. First, the subpoena was not directed to all firms manufacturing equipment that may be classified as falling in this field. Indeed, as Proposed Finding 405 demonstrates, about as many firms were omitted as included.

426. Second, the specifications are not an exhaustive list of the products which might be included within the term "inhalation anesthetic equipment and accessories." For example, laryngoscopes were not specifically listed on the subpoena, although the product is significant enough for Air Products to have sold over [D 42] worth in 1973. (CX 317-B)[1/] Moreover, dozens of products were listed by reporting firms under "other" and there is simply no assurance that a product that firm A took the trouble to so list was included by other firms also manufacturing the same item. For example, a number of firms reported various items of monitoring and metering equipment, such as oxygen analyzers (e.g., CX 326-Z-35; CX 317-B) and alarms and monitors (e.g., CX 317-B; CX 330-C) under "other", but there is no assurance that all reporting firms manufacturing such equipment included it within their subpoena returns. Indeed, the adequacy of the subpoena specifications is demonstrated by the fact that more than one-third of all sales reported were listed as "other". (Figure 23)

427. Third, the subpoena specifications were ambiguous, particularly in failing to define the terms "inhalation anesthetic equipment and accessories" and "manufactured". The specifications did not even include the definition of the former that is contained in the complaint. Hence, there is no

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1/ Dr. Hedley-Whyte testified that more than 80% of laryngoscopes are used in inhalation anesthesia. (Hedley-Whyte 1208)

FIGURE 23

[D 43]

assurance that the reporting firms construed the subpoena in a manner consistent with one another, with respondents, or with the allegations of the complaint.

428. There is substantial reason for questioning the validity of many of the returns on this basis. For one thing, the specification for anesthesia machines does not specifically indicate whether the responding firm was expected to include both human and veterinary equipment or whether nitrous oxide dental analgesia equipment was to be included. Thus, Porter Instrument reported its sales of dental analgesia equipment under "other". (CX 318) Moreover, while item (d)(ii) -- anesthesia conducting tubes -- might be interpreted as calling for disposable anesthesia breathing circuits, not all reporting firms so construed it, as at least one reported that product under "other". (CX 326-Z-49) Further, there are substantial ambiguities resulting from the lack of a definition of "manufactured", as such firms as Rusch, Portex and Medical & Industrial Equipment reported no manufactures, though they were identified at the hearing as manufacturers and appear either to subcontract their manufacturing out or to import products from their European parent companies, and such products were included in the definition of "manufactured" by respondents. (CX 329-A/D; CX 326-Z-41; CX 326-Z-25; Cosgrove 2325, 2352-53; Schreiber 1061)

429. Subject to such difficulties, the sales of the products manufactured by the reporting firms are listed on Figure 23.

(c) Ranking of Firms

430. Given the incompleteness of the data, it is impossible to rank the firms accurately in order of their sales of manufactured products. About half of the firms are not included at all -- they received no subpoenas. Moreover, even ranking the firms which responded to subpoenas is hazardous, since the subpoena specifications are incomplete.

431. It is almost impossible to base firm rankings on the opinions of the industry witnesses. Mr. Schreiber, for example, testified only that in his opinion Ohio and Foregger are the largest producers in the United States of inhalation anesthetic equipment and accessories -- a short ranking. (Schreiber 1088)

432. Dr. Hedley-Whyte testified that in his opinion Ohio, Air Products, Fraser Sweatman and Harris Lake accounted for 90% of the inhalation anesthetic equipment manufactured in the United States. (Hedley-Whyte 1214) But a moment later he acknowledged that his estimate applied only to anesthesia machines and anesthesia ventilators, and did not take account of any accessories sales. (Hedley-Whyte 1217-18)

433. Moreover, Dr. Hedley-Whyte's information concerning the marketplace was often inaccurate. For example, he testified that Ohio, Air Products, Fraser Sweatman and Harris Lake -- which he insisted upon referring to as "the big three" -- all manufactured polarographs and, in fact, that a committee at his hospital told him not to buy BOC polarographs. (Hedley-Whyte 1251-53) The fact is that neither Fraser Sweatman, nor Harris Lake, nor BOC, nor Ohio makes or sells polarographs in the United States. (CX 330, 327, 328) Again, his testimony that Ohio, Air Products, Fraser Sweatman and Harris Lake accounted for 90% of the anesthesia machines and anesthesia ventilators made in the United States is contradicted by data in the record, including the fact that Air Products, Fraser Sweatman and Harris Lake do not make anesthesia ventilators. (Figure 22)

(d) Size of the Field

434. Unlike the industrial gas field, there are no broadly based statistics from which to estimate total sales of inhalation anesthetic equipment and accessories. The sales data submitted in response to complaint counsel's subpoena, as we have seen, are incomplete because it did not include all of the firms and was not well-designed to elicit complete information with respect to the firms served. Moreover, no Census or trade association statistics were offered at the hearing.

435. The only evidence in the record on this issue are the estimates of four industry witnesses.

436. Mr. Schreiber estimated that the sales at the manufacturer level of inhalation anesthetic equipment and accessories manufactured in or imported into the United States were $30 million in 1973, including monitoring equipment. The reliability of these estimates is questionable. (Schreiber 1072)

437. First, Mr. Schreiber himself testified candidly that his estimate was "a guess with a wide possibility of being wrong" and was "not backed by a lot of information." (Schreiber 1072)

438. Second, with due respect to Mr. Schreiber's good faith and expertise, his marketing experience does not appear to be sufficiently broad to make him particularly well informed on this issue. His company, North American Draeger, has almost inconsequential sales and sells all of its veterinary equipment and most of its human anesthetic equipment through dealers. (Schreiber 1101-02) Moreover, it does not manufacture any rubber or plastic goods (CX 314-15), which are a major element in this field (Figure 23). Thus, Mr. Schreiber's experience in the marketplace is limited.

439. The second witness to estimate the size of the alleged market was Mr. Porter of Porter Instrument, who offered his opinion

that "the total U.S. net sales at production level of inhalation anesthetic equipment and accessories," were about $20 million in 1973. (Porter 1315) This estimate included dental analgesia equipment which he estimated at $4 million. (Porter 1334, 1346)

440. Again, Mr. Porter does not appear to have been a witness well-equipped to offer an opinion. The only products made by Porter Instrument which might arguably be classified as being in the field are flow meters and nitrous oxide dental analgesia equipment. (CX 318) It made no anesthesia machines, anesthesia vaporizers, ventilators or rubber and plastic products. (Ibid.) Hence, Mr. Porter's expertise would seem really to be limited to the dental field. Moreover, it is questionable even there, as Porter Instrument does not market its own products, but sells its entire output to Chemetron, which does the marketing. (Porter 1299-1302)

441. The third witness on this issue was Mr. Scott of Air Products, who did not offer his personal opinion. Mr. Scott merely testified that his company's estimate of the total United States sales of inhalation anesthetic equipment and accessories at the manufacturing level in 1973 was $30 million, plus or minus 15%. (Scott 1358-59) This estimate excluded dental analgesia equipment, but included monitoring equipment. (Scott 1373-75) Since Mr. Scott was not testifying from his own knowledge -- and so could not be cross-examined -- his testimony is of little use.

442. Finally, Mr. Cosgrove of Ohio was unable to offer an estimate for the entire field. Instead, he estimated that sales of anesthesia machines in 1973 were $10 million, sales of endotracheal products were $5 million, sales of machine accessories were $3 to $4 million, sales of disposable anesthesia breathing circuits were $7 million, sales of ventilators were $3 to $4 million, and sales of monitoring equipment used by anesthesiologists in administering anesthesia were $50 million. (Cosgrove 2513-14, 2367) He was unable to estimate sales of rubber goods. (Cosgrove 2514) Thus, Mr. Cosgrove estimated the manufacturer level sales in this field, excluding rubber goods and veterinary and dental anesthesia equipment (Cosgrove 2356), at $80 million, or $30 million if monitoring equipment were excluded. (Cosgrove 2513, 2367)

443. Mr. Cosgrove was clearly the witness best equipped to make such estimates for the non-dental area, as Ohio has the broadest product line of the reporting firms and he gave greatest evidence of having studied the question. (Figure 23, supra; Cosgrove 2365-66, 2470-71) Mr. Porter was the only witness in the dental business. Assuming that it is proper to reach a conclusion as to the size of the field on a record such as this, the best approximation seems to be that the size of the field at the manufacturer level in 1973 was about $35 million excluding dental, monitoring and metering equipment; that dental analgesia sales were about $4 million; and that monitoring and metering equipment sold for use by anesthesiologists was about $50 million.

(e) Shares of Manufacturer-Level Sales in the Field

444. There are several possible means of computing estimated shares of the manufacturer-level sales of inhalation anesthetic equipment and accessories on the basis of the stipulations, subpoena returns and estimates of total sales, making various assumptions as to inclusion and exclusion of products from the calculation:

(1) Company sales of products specifically listed on the subpoenas;

(2) Company sales of all products listed reported pursuant to the subpoenas and stipulations;

(3) Company sales of products specifically listed on the subpoenas, excluding respirometers;

(4) Company sales of all products reported pursuant to the subpoenas and stipulations, excluding respirometers and other monitoring equipment.

445. Special account is taken of respirometers, since their function is to measure the minute volume of gas exhaled by a patient. They are not used directly for the administration of anesthetic or therapeutic gases. Hence, respirometers fall into the category of monitoring and metering equipment and should be included in the sales of individual firms only if the overall inhalation anesthetic equipment field is defined to include comparable devices.

446. Moreover, these estimates should be made with and without inclusion of dental and veterinary equipment, although the latter is impossible as there is not even a seat-of-the-pants estimate on the record as to the size of the veterinary field.

447. Based on the sales figures contained in Figure 23 and the estimates that the size of the field for human equipment alone is $35 million excluding monitoring equipment and $85 million including it, plus an additional $4 million if dental equipment is included, the respective shares of Ohio, Fraser Sweatman and Harris Lake are as listed on Figures 24 and 25. The shares of the other 23 firms for which there is data in the record appear on Figure 26.

FIGURE 24

[D 44]

FIGURE 25

[D 45]

FIGURE 26

[D 46]

B. Inhalation Therapy Equipment and Accessories

1. Manufacturing

448. The situation regarding manufacturing of inhalation therapy equipment and accessories, however the term may be defined, is much the same as that for inhalation therapy equipment and accessories. There are a large number of manufacturers, most of which make only a few of the many products that may be included in the field. Figure 27 lists the firms for which information was collected pursuant to complaint counsel's subpoena, and shows the particular products which those firms and respondents reported as having made or imported in 1973.

449. In addition, the record reveals that the following firms, for which there is no sales data in the record, manufacture at least the products listed below:

Aloe	respiratory care equipment including suction catheters (Matsch 1504-07; BOC RX 249, p. 210)
Bendix Corp.	home oxygen generators; ultrasonic nebulizers (Cosgrove 2396-97, 2502; BOC RX 230, p. 377; BOC RX 252, p. 21).
Blount, Inc.	nebulizers, masks, and other equipment (Cosgrove 2397, 2503; BOC RX 249, p. 229)

	Ventilators, Respirators, Resuscitators, Humidifiers and/or Nebulizers	Inhalation Therapy Delivery Tubing - Reusable	Inhalation Therapy Delivery Tubing - Disposable	Inhalation Therapy Face Masks - Reusable	Inhalation Therapy Face Masks - Disposable	Inhalation Therapy Flow Meters	Nasopharyngeal Catheters and Cannulae Reusable	Nasopharyngeal Catheters and Cannulae Disposable
Abbott Laboratories			X					X
Air Products	X		X			X	X	
American Hospital Supply			X		X			X
B&F Medical Products	X							
C.R. Bard, Inc.	X		X		X			
Becton Dickenson & Co.	X		X					X
Bird Corp.	X	X						
Chemetron						X		
DeVilbiss Co.	X							
Dittmar Penn Corp.								
Dupaco								
J.H. Emerson Co.	X	X		X		X		
Hudson Oxygen	X		X		X			X
International Paper - Davol			X					X
Isolette	X							
Minnesota Mining			X					
Mistogen	X							
Monaghan Co.	X	X	X	X	X	X		X
National Catheter Corp.								
North American Draeger								
OEM Medical	X		X	X	X			
Oxequip	X			X		X		
Puritan-Bennett Corp.	X		X	X	X	X		X
Respiratory Care, Inc.								
Sherwood Medical Ind.			X					X
Smith & Weston Electronics	X							
Riker Laboratories								
Ohio	X	X		X	X	X		

Source: CX 314, CX 315, CX 316, CX 317, CX 318, CX 320, CX 321, CX 326, CX 327, CX 329, CX 330
247, p. 46A)

Figure 27 292B

Oropharyngeal Airways Reusable	Oropharyngeal Airways Disposable	Inhalation Therapy Drain/ Condensation Bottles	Adapters and Fittings	Yokes, Valves, Handscrews	Respirometers	Bacteria Filters	Tracheotomy Tubes - Reusable	Tracheotomy Tubes - Disposable	Incubators Used in Controlling or Assisting Breathing	Other
X	X		X					X		X
										X
										X
			X							X
										X
							X			X
			X							
		X			X	X				X
X				X	X					X
								X		
					X		X		X	X
										X
									X	X
X			X	X						
								X		
					X					X
					X				X	X
X		X	X	X						X
		X			X	X				X
										X
										X
		X	X			X			X	X

A 636

Bourn	pediatric resuscitators (Cosgrove 2490; Matsch 1504-06)
Bretec	hand nebulizers (Cosgrove 2517)
John Bunn	oxygen tents and humidifiers (Cosgrove 2397, 2504; BOC RX 249, p. 242; BOC RX 248, p. 114)
Cavitron	respiratory monitors (BOC RX 231, p. 49)
Warren E. Collins Co.	diagnostic equipment (Matsch 1504)
Continental Hospital Supplies	inhalation therapy equipment (McWhinnie 1540)
Everest & Jennings	IPPB equipment and resuscitators (Cosgrove 2397-98, 2505; BOC RX 250, p. 55)
Extracorporeal Medical Specialties, Inc.	tracheostomy tubes (BOC RX 230, p. 335)
Owens-Illinois	inhalation therapy equipment (BOC RX 253-B)
General Electric	diagnostic equipment (Matsch 1504)
Globe	inhalation therapy equipment (Cosgrove 2500)
Healthdyne, Inc.	intermittent mandatory ventilation controller (BOC RX 231, p. 11)
Hewlett Packard	diagnostic equipment (Matsch 1504)
Laerdal	resuscitators, masks and valves (Cosgrove 2490, 2500; BOC RX 250, p. 14; BOC RX 247, p. 46A)

LKB Medical	imports and distributes engstrom ventilators and respirators (Cosgrove 2505; Karpick 1400; Matsch 1504-06)
McGaw Laboratories	humidifiers (BOC RX 252, p. 41)
Mine Safety Appliances	IPPB equipment and other inhalation therapy equipment (Cosgrove 2400-01, 2494-95; BOC RX 249, p. 162)
Shiley Laboratories	tracheostomy tubes (BOC RX 252, p. 22)
Ventronics	ventilator alarm (BOC RX 261, p. 64)
Victor Medical Products	resuscitators, nebulizers, oxygen therapy equipment (Cosgrove 2508; BOC RX 252, p. 24)
Winthrop Laboratories	hand nebulizers (Cosgrove 2379)

450. Fraser Sweatman does not make or import any inhalation therapy products. (CX 327).

451. The only Harris Lake product possibly classifiable as inhalation therapy equipment is the Wright respirometer (CX 327). But this piece of monitoring equipment is used in anesthesia as well as in inhalation therapy (Karpick 1421), and, as Mr. Schreiber testified, ". . . it is impossible if a respirometer is sold to a dealer to determine if it is used in the hospital for

inhalation therapy or anesthesia." (Schreiber 1048) The record contains no suggestion as to what portion, if any, of the Harris Lake respirometers wind up being used principally in respiratory care. In consequence, it can not be said with sureness that Harris Lake is in the field at all. And if Harris Lake could be said to be in the field, then the field would include monitoring equipment - of which the Wright respirometer is an example - and total industry sales would be $50 million higher.

2. Distribution

452. Distribution of inhalation therapy equipment and accessories is done both directly by manufacturers and by dealers. (Cosgrove 2387) Harris Lake sells its Wright respirometers to dealers. (Karpick 1400)

3. Barriers to Entry

453. Entry into the inhalation therapy field is not difficult.

454. All of the plants of one of the largest manufacturers in this field -- a manufacturer specializing in the most complex equipment, ventilators and respirators -- could be duplicated for $7 to $8 million. (Matsch 1500) Many of the manufacturers have much smaller investments. (Matsch 1528) One long established firm with a relatively broad product line operates out of very modest

premises (BOC RX 21-23; McWhinnie 1557-64) and was recently sold for under $1 million (McWhinnie 1572-84; BOC RX 203).

455. Since dealers play much the same role in the inhalation therapy field as in anesthesia, the development of sales and service capability would seem to present no great problem.

456. The conclusion that entry into this field is not difficult is supported by the fact that a number of new manufacturers have entered the business in recent years, bringing the total number to about 59, while none has gone out of business in the last five years. (Cosgrove 2388)

4. Concentration and Market Shares.

457. Estimation of the market shares of the respondents and of the degree of concentration of the manufacturing of inhalation anesthetic equipment and accessories is subject to some great difficulties as were found with respect to inhalation.

(a) The Respondents

458. While considerable time and space could be devoted to analysis of which products should be classified as inhalation therapy equipment and accessories, there is no need to do so here, as the inquiry would be immaterial.

459. The total sales products that might be so classified that were manufactured by Ohio were [D 47] in 1973 excluding

pulmonary function equipment, [D 48] if pulmonary function equipment is included.[1/]

460. Fraser Sweatman did not manufacture any inhalation therapy products.

461. As we have seen, the only Harris Lake product which might be used in inhalation therapy is the Wright respirometer, of which total 1973 sales were [D 49] (CX 327-H)

(b) Other Firms

462. The information in the record regarding sales of products manufactured by other firms are the returns to complaint counsel's third-party subpoenas. (CX 314-15; CX 316-D; CX 317; CX 318; CX 320; CX 321; CX 326; CX 329) The information contained in those returns is incomplete and unreliable for the same reasons as that regarding inhalation anesthetic equipment.

463. First, the subpoena was not directed to all firms manufacturing equipment that may be classified as falling in this field.

1/ These figures are taken from CX 330 and the testimony of Mr. Cosgrove at 2379-86. All of the products listed on CX 330-D, starting at line 6, through CX 330-H are included except those which Mr. Cosgrove testified were not used for the administration of gas for therapeutic purposes or which he described as pulmonary function equipment.

As proposed Finding 448 indicates, nearly as many firms were omitted as included.

464. Second, the specifications to the subpoena did not list all of the products which might be included within the term "inhalation therapy equipment and accessories." It did not even list all of the major products which complaint counsel assert are in the alleged market. For example, no specific reference was made to IPPB equipment, although the sales of such equipment are substantial. Moreover, as with anesthesia equipment, many products were listed by reporting firms under "other", and it is impossible to be certain that products which one firm so listed were reported by others manufacturing the same items.

465. Subject to these difficulties, the reported sales of all of the products listed as inhalation therapy equipment and accessories are listed on Figure 28.

(c) Ranking of Firms

466. Ranking of firms in order of size is even more difficult for inhalation therapy than for anesthesia equipment. The number of firms involved is at least as large. There is not even a central core of major pieces of equipment comparable to anesthesia machines to provide a focus for opinions on the subject.

FIGURE 28

[D 50]

467. There was little testimony given at the hearing with respect to the ranking of firms in the inhalation therapy field. Mr. Matsch of Monaghan testified that Monaghan's four top competitors in the manufacture of respiratory care equipment and accessories are Puritan-Bennett, Ohio, Bird and Air Shields, which is a division of Narco Scientific. (Matsch 1494, 1526) But he defined "respiratory care equipment" so narrowly as to exclude almost all products except ventilators, respirators, resuscitators and IPPB devices, thereby making the list of little utility. (Matsch 1526-27). Mr. Baker of Air Products testified that Puritan-Bennett is the leading company in the sale of inhalation therapy equipment in the United States. (Baker 452)

468. Apart from the estimate that Puritan-Bennett was the largest firm in this field, which is borne out by the evidence (Figure 28), the other estimates are of doubtful accuracy, even on the basis of the incomplete information available. For example, Hudson Oxygen, a firm not mentioned by Mr. Matsch, was at least as large as Ohio and perhaps as much as doubly so. (Figure 28)

(d) Size of the Field

469. Again, there are no Census or trade association statistics from which to estimate the size of the inhalation therapy equipment and accessories field.

470. The only evidence on this issue is the testimony of Messrs. Matsch and Cosgrove as to their estimates of total United States sales.

471. Mr. Matsch testified that the total U.S. sales of respiratory care equipment at the manufacturing level were about $75 million in 1972 and about 13% higher, or about $85 million, in 1973. (Matsch 1497-98) However, Mr. Matsch's estimate did not include a substantial number of categories of equipment which are relevant here. He excluded inhalation mouth pieces, vacuum and suction equipment, suction catheters, metal inhalation tubes, trachea tube cups, trachea "T" adapters, nylon inhalation tubes and hand-held nebulizers, oxygen analyzers and monitors, emergency oxygen equipment, oxygen tents, tracheotomy kits, incubators, oxygen blenders, hand-operated resuscitators, and portable oxygen assemblies. (Matsch 1515-20) Many of these items were included in the sales reported by the firms for which there are statistics. (E.g., CX 330) In fact, Mr. Matsch later admitted that he only included in his $75 million estimate:

> "the type of equipment which . . . actually carries out the function of respiration of some variety. In other words, it creates either a positive pressure on the airway or a negative pressure around the chest. That type of device is what we are talking about and not all of the accessories and everything that is used for oxygen therapy and all of the rest of the areas." (Matsch 1527)

He was unable to estimate the sales of the many accessories and other items of equipment involved here. (Matsch 1528)

472. Mr. Cosgrove also did not estimate total sales of inhalation therapy equipment and accessories. He testified only that his estimate of sales of respirators, resuscitators, humidifiers, nebulizers, respirometers, and IPPB equipment was $75 million. (Cosgrove 2498-99)

473. Thus, the only estimates of sales in the record excluded many items said by complaint counsel to be within the field of inhalation therapy equipment and accessories, even if that term is limited to the products listed on complaint counsel's subpoena, CX 316-B.

474. Thus, complaint counsel have not proven total sales of inhalation therapy equipment and accessories.

(e) Shares of Manufacture-Level Sales in the Field

475. With total sales unproven, calculation of individual companies' shares of sales is impossible. However, if we assume total sales of items manufactured and imported in the field were $85 million in 1973 -- a below-minimal figure in the light of the testimony of Messrs. Matsch and Cosgrove -- Ohio's share would be [D51] Figure 29 shows comparable data for the reporting firms. Hence, even on the view most favorable to complaint counsel, Ohio ranks no better than sixth in this field, with sales of less than one-third of the leader, Puritan-Bennett.

Figure 29

SHARES OF ESTIMATED TOTAL U. S. SALES OF ALL INHALATION THERAPY PRODUCTS MADE BY REPORTING FIRMS

Firm	Reported Sales of All Manufactured Products	% of Estimated Total Sales of $85,000,000
Abbott Laboratories		
Air Products		
American Hospital Supply		
B & F Medical Products		
C. R. Bard		
Becton Dickenson		
Bird Corp.		
Chemetron		
DeVilbiss Co.		
Dittmar Penn Corp.		
Dupaco		
J. H. Emerson Co.		
Hudson Oxygen		
International Paper		
Narco - Isolette		
Minnesota Mining		
Mistogen		
Monaghan		
National Catheter		
N. A. Draeger		
OEM Medical		
Oxequip		
Puritan-Bennett		
Respiratory Care		
Sherwood Medical		
Smith & Wesson Electronics		
Riker Laboratories		

[D 52]

476. Fraser Sweatman's share is zero. Harris Lake's share is zero unless an assumption is made - which must, as we have seen, be speculation -- that some portion of its Wright respirometers are used in respiratory care. If we assume half are used for that purpose, its share of total sales in the field would be [D 53] in 1973.

(6)

Competitive Effects of the Acquisition

A. The Extent of Competition Between BOC and Airco

477. A first step in analyzing the competitive effects of BOC's acquisition of an interest in Airco on the alleged medical equipment markets is to determine the extent to which Ohio competed with Fraser Sweatman and Harris Lake prior to the acquisition.

478. There was no competition between Ohio and Fraser Sweatman and Harris Lake in the manufacture or importation of inhalation therapy equipment and accessories, as the BOC subsidiaries were not engaged in that line of business. Even if Harris Lake's Wright respirometer were deemed to be inhalation therapy equipment, this conclusion would not be altered, as Ohio does not make or sell any respirometers. (Cosgrove 2328-29) Moreover, Ohio is a relatively small factor in the inhalation therapy field.

479. The degree of overlap between Ohio and Harris Lake in the anesthesia field is quite small. Both made anesthesia machines, though Harris Lake's 1973 sales of this product amounted to only [D 54] (CX 330; CX 327-H) Only three other products made by Harris Lake or purchased by it from BOC and

its subsidiaries were also made by Ohio: Y pieces and inhalator valves, carbon dioxide absorption cannisters and disposable airways. (CX 327-C/D; CX 330) Harris Lake's total 1973 sales of such items were [D 55] Thus, of Harris Lake's total 1973 sales of [D 56] only [D 57] were of products made by it and by BOC of types also manufactured by Ohio.

480. A similar situation is encountered with respect to Fraser Sweatman. The largest category of its sales consists of dental analgesia machines and accessories, which Ohio does not make. (CX 327-G ; Cosgrove 2311) There is some overlap with respect to human and veterinary anesthetic machines and accessories. In 1973 Fraser Sweatman's total sales of such products manufactured by it and BOC were [D 58] .

481. While both Ohio and Fraser Sweatman sell vaporizers, the types made by each are different. Fraser Sweatman makes almost exclusively "tec-type" vaporizers (CX 146-I), a special type of drug-specific vaporizer not manufactured by Ohio. (Cosgrove 2300, 2307) Apart from vaporizers which are built as integral parts of Ohio anesthesia machines and not separately sold, Ohio makes only a single vaporizer (designed to fit Ohio anesthesia machines) and two simple ether vaporizers. (CX-A, Form 1754, pp. 11-13; Cosgrove 2299-2307) Thus, apart from the ether vaporizers, which are old-fashioned and

apparently passing out of use (Cosgrove 2299, 2305), the vaporizers made by Fraser Sweatman and Ohio are of quite different types. Moreover, there is no evidence that they are competitive with one another, and the fact that Fraser Sweatman sells its tec-type vaporizers to Ohio (Cosgrove 2307-08) suggests that they are not.

482. Accordingly, of the combined 1973 sales of Fraser Sweatman and Harris Lake of [D 59] only [D 60] is attributable to products made by those firms or BOC which are possibly competitive with products made by Ohio -- and only in inhalation anesthesia. Even if one assumes that the total manufacturer-level sales of inhalation anesthesia equipment and accessories were $35 million in 1973, the manufactures of Fraser Sweatman and Harris Lake that may be competitive with manufactures of Ohio amount to little more than [D 61] of the total.

B. Effects on the Industry

1. Inhalation Anesthetic Equipment

483. The market share data as to inhalation anesthesia equipment in this record will not support any inferences as to possible effect on competition of a BOC-Airco relationship.

484. To begin, the significance of the "market share" data here available is doubtful. The number of products in the alleged anesthetic equipment market is large, and the typical

manufacturer makes only a few. Moreover, the products made by one may be so dissimilar to those made by another as to preclude a finding that the two compete.

485. There are several clear examples. For instance, Ohio manufactures a broad line of anesthetic equipment and its manufactures exceeded in value those of any other firm for which there is information in the record. The second largest firm, so far as this record reveals, is National Catheter. One might expect that Ohio and National Catheter, as the largest and second largest known firms in a "market", would be competitors. But this record proves the contrary. National Catheter sells only one product: disposable endotracheal tubes. And Ohio makes no endotracheal tubes, disposable or reusable. Moreoever, so far as the record reveals, there are no other products that will perform the same function as endotracheal tubes. Hence, Ohio and National Catheter are not competitors in any conventional sense of the word.

486. As has been seen, very much the same reasoning is applicable to the competitive relationships between the BOC subsidiaries and Ohio. Harris Lake's sales of the Wright respirometer are not relevant in assessing the extent of competition between it and Ohio because Ohio does not make

respirometers or any comparable product. Similarly, Fraser Sweatman's sales of dental analgesia equipment and tec-type vaporizers are also irrelevant. And when one eliminates these products, there is very little left of Harris Lake and Fraser Sweatman.

487. Complaint counsel adduced no evidence with respect to likely competitive effects of this acquisition on the alleged inhalation anesthesia market except the sales data. No expert witnesses were called, and the industry witnesses that testified had nothing to say on this subject. Since the sales data introduced by complaint counsel provide no basis for drawing any conclusions as to the probable competitive effects of this acquisition on this alleged market -- both because the statistics are incomplete and unreliable and because they are essentially meaningless given the structure of the alleged market -- and since the industry is not walled off from new competition by high entry barriers, it must be concluded that complaint counsel have failed to demonstrate that the effect of this acquisition may be substantially to lessen competition, or to tend to create a monopoly, in the alleged market.

2. Inhalation Therapy Equipment

488. While the findings with respect to the competitive effects of this acquisition in the alleged inhalation anesthetic

equipment market are fully applicable here, two other facts are of overriding importance. Fraser Sweatman and Harris Lake were simply not competitors of Ohio in the alleged inhalation therapy market -- even if Harris Lake's sales of Wright respirometers are moved into inhalation therapy. Moreover, Ohio was no better than the number six firm in the field, far behind the leader. It must be concluded that complaint counsel have failed to demonstrate that the effect of this acquisition may be substantially to lessen competition, or to tend to create a monopoly, in the alleged inhalation therapy equipment and accessories market.

ARGUMENT

I

COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT "INHALATION ANESTHETIC EQUIPMENT AND ACCESSORIES" OR "INHALATION THERAPY EQUIPMENT AND ACCESSORIES" IS A RELEVANT LINE OF COMMERCE UNDER SECTION 7

The complaint alleges that "inhalation anesthetic equipment and accessories" and "inhalation therapy equipment and accessories" are relevant lines of commerce. (Cpt. ¶ 1) Those terms are defined:

> "(b) 'Inhalation anesthetic equipment' is equipment and accessories used in the administration of gas for anesthetic purposes.
>
> "(c) 'Inhalation therapy equipment' is equipment and accessories used in the administration of gas for therapeutic purposes."

Thus, the complaint does not specify what particular items are in the alleged markets, but instead merely states broad descriptions.

Evidence was received concerning scores of products which might be classified in each of the alleged markets, particularly under the generic descriptions contained in the complaint.

The overriding conclusion to be drawn from the record is that the profusion of products discussed in the contexts of each of the alleged markets are almost never interchangeable. The anesthesia-related products have in common only the fact

that they are used by anesthesiologists in connection with the administration of anesthetics, and the inhalation therapy products have in common only the fact that they are used by physicians in the treatment of patients with respiratory deficiencies.

As we pointed out in the section of this brief dealing with the alleged industrial gas market, Brown Shoe held that:

> "The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it." Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962) (footnote omitted).

In the light of this requirement, both the list of "inhalation anesthesia" products and the list of "inhalation therapy" products go far beyond "[t]he outer boundaries of a product market."

Moreover, tests established by Brown Shoe for definition of a submarket within a product market are scarcely satisfied by either of the alleged markets.

While there may be limited cross-elasticity of production facilities within each field, the cross-elasticity extends only to certain subgroups of the alleged markets, such as rubber goods or plastic goods, that are entirely unlike the

balance of the products sought to be included. Moreover, the equipment and processes used are not unique to products used in connection with the alleged markets, but are of far more general application.

The products are all sold at distinct prices, and there is no sensitivity to price changes among the various items except for the obvious relationships between disposable and reusable models of the same product and between the price of, for example, an anesthesia machine and its components.

The criterion of specialized vendors is not satisfied. There is no evidence of such vendors for inhalation therapy products. The dealers selling anesthesia equipment are either general hospital supply dealers or, if they are specialized anesthesia product dealers, they sell a broader range of equipment than is claimed to fall in the alleged market. (Proposed Finding 409)

While some of the testimony may indicate industry or public use of the terms "inhalation anesthesia equipment" and "inhalation therapy equipment", the record does not reveal that either the industry or the public recognized any clearly defined group of products as falling into either category. Indeed, there was considerable disagreement over

the inclusion of such products as monitoring equipment, dental analgesia equipment, veterinary equipment, and pulmonary function equipment.

Most of the products in each of the alleged markets have peculiar characteristics and uses. For example, anesthesia machines regulate the pressure and flow of gas to the patient. Vaporizers do neither; they achieve a desired concentration of anesthetic agent in a gas. And carbon dioxide absorption cannisters merely hold a chemical agent used for removing carbon dioxide from gas exhaled by the patient. Similarly, respirators force air or gas into a patient with a breathing insufficiency while humidifiers merely make whatever gas the patient breathes -- including air -- moist.

The only Brown Shoe test which is even arguably satisfied by the alleged medical markets is the existence of distinct customers. The record establishes that the principal "hardware" items in the anesthesia field -- anesthesia machines, vaporizers and anesthesia ventilators -- are bought chiefly by anesthesiologists. But the same was not shown to be true for all of the other products sought to be included in the anesthesia field. Moreover, while the evidence demonstrates that there are physicians and paraprofessionals who specialize in treating breathing deficiencies and who use inhalation therapy

equipment, much equipment classified under this heading -- e.g., laryngoscopes, incubators, tracheotomy tubes, and humidifiers -- is sold also for use by others.

The cluster market cases, discussed at pp. 214-28, supra, require no different conclusion.

Given the lack of interchangeability of the products claimed to be in the alleged markets and the failure to satisfy any of the other Brown Shoe tests, the fact that identifiable groups of the medical profession buy products in the alleged markets cannot be determinative. This circumstance is simply not sufficient to make the alleged markets relevant economic entities in which to test the effects of this acquisition, as it totally ignores the seller's side of the equation. Moreover, to define markets on the basis of this criterion alone would prove too much, as it would result in the inclusion in an anesthesia market of at least all those items that are sold principally to anesthesiologists, including oxygen, other gases, anesthetic agents, syringes, and the like. Here, as Figures 22 and 27, supra, pp. 267,292 demonstrate, there are almost no full-line manufacturers in either of the alleged markets. Rather, most firms make only one or a few of the products, and these limited-line manufacturers necessarily compete only against other firms making the same items. Hence, competition at the manufacturing level in the alleged markets is not on a full-line basis, but product by product.

This factor distinguishes this case from the cluster market cases. As the Commision has said, the cases "where 'non-homogenous products' have been held to constitute a line of commerce . . . [are] cases [in which] it was established or undisputed that resource flexibility existed or that the product groupings were sold as a full line by most firms." Sterling Drug, Inc., 80 F.T.C. 477, 595 n.19 (1972). Since neither of those factors is present here, the cluster market cases do not support the view that these alleged markets consisting of non-interchangeable products are relevant lines of commerce for Section 7 purposes.

II

COMPLAINT COUNSEL HAVE FAILED TO PROVE THAT THIS ACQUISITION MAY SUBSTANTIALLY LESSEN COMPETITION OR TEND TO CREATE A MONOPOLY IN EITHER OF THE ALLEGED MEDICAL EQUIPMENT MARKETS

Complaint counsel's medical equipment case is a classic example of the "introduce the statistics and rest" approach to Section 7. United States v. Ford Motor Company, 286 F. Supp. 407, 417 (E.D. Mich. 1968), aff'd, 405 U.S. 562 (1972).

The only evidence adduced at the hearing with respect to the probable effects of this acquisition on competition in the alleged medical equipment markets was the sales data for the respondents and certain other firms, and the so-called Papercraft estimates of the size of the markets, i.e., market share and concentration statistics. No expert was called to testify to the probable effect of the acquisition, no industry witness was asked about it. Instead, complaint counsel chose to begin and end with bare statistics.

But the statistical evidence in this record provides no basis for concluding that this acquisition is likely to have the prohibited anti-competitive effects.

A. Inhalation Anesthetic Equipment

1. The Statistical Evidence Offered by Complaint Counsel Is so Incomplete and Unreliable as to Make Reliance Upon It Improper

Both the evidence of the sales of products manufactured by respondents and other firms and the estimates of the total size of the market are so incomplete and unreliable as to be little more than useless.

(a) The Subpoena Returns

The returns on complaint counsel's subpoenas duces tecum addressed to firms other than respondents are not reliable evidence of sales: the subpoena form was not reasonably designed to elicit complete and accurate information.

First, the subpoena requested that the responding firms list:

> "1973 total U.S. net sales data by separate product category, for all inhalation anesthetic equipment and accessories manufactured and sold by your company including, but not limited to the list appearing in" the subpoena specifications. (CX 316-A)

The subpoena does not contain a definition of "inhalation anesthetic equipment and accessories." It does not even contain the definition alleged in the complaint. Thus, the

subpoena left definition to the responding firms in important measure. Accordingly, there is no reason to believe that the firms responding to the subpoena defined "inhalation anesthetic equipment and accessories" in the same way nor is there any assurance that any of them defined the term in a manner consistent with the allegations of the complaint. In consequence, the returns are inherently unreliable.

Second, the subpoena specifications did not indicate whether information was desired with respect to dental analgesia equipment (on the face of it, it would seem that such information was not required) or veterinary equipment. Hence, it is impossible to be certain that all such equipment made even by the reporting firms was disclosed in their subpoena returns.

Of course, statistical precision is not necessary in a Section 7 case, particularly where there can be no quarrel with the broad outlines of the competitive picture portrayed. Brown Shoe Co. v. United States, 370 U.S. 294, 341 n. 69 (1962). But here it is not precision we are concerned with but reliability. Where the whole case turns on arithmetic, it was essential that the figures obtained from different companies be comparable and complete. Regrettably, that was not accomplished. The specifications were not drawn to elicit data that were complete, internally consistent, compatible with

the allegations of the complaint, or comparable to the data provided by respondents.

(b) The Size of the Alleged Market

The subpoena directed to third-party manufacturers of anesthetic equipment concededly was not served on all such manufacturers in the United States. In fact, the record indicates that it was served on substantially less than half. Hence, the subpoena returns do not provide a firm underpinning for a conclusion as to the total size of the alleged market.

Recognizing this, and lacking Census data or comparable figures, complaint counsel elected to rest on estimates of the size of the alleged market offered by a series of industry witnesses. (Proposed Findings 434-41)

While we submit that such estimates are no substitute for proof in any Section 7 case when more reliable methods exist and are not unduly burdensome, they are plainly insufficient here. With one exception, the witnesses were not individuals whose business experience was such as to give them the breadth of knowledge of the entire alleged market necessary to making an informed judgment.

Mr. Schreiber of North American Draeger is with a tiny company that does little direct marketing, makes no dental equipment, and does not manufacture rubber or plastic goods, which are a major part of the alleged market.

Mr. Porter is with a firm that, to all intents and purposes, makes only dental equipment, and does not even market that equipment itself.

The testimony of Mr. Scott was not significantly more helpful. He did not even offer his personal opinion, which is understandable in view of the fact that he has spent his career with Air Products in the industrial gas division until just 6 months ago. (Scott 1350-51, 1357) Moreover, the market estimate he offered excluded dental equipment.

The record does not contain a total market estimate by Mr. Cosgrove, as he was unable to estimate sales of rubber goods and veterinary and dental equipment.

The Commission's decision in Papercraft Corp., 78 F.T.C. 1352 (1971), modified on other grounds, 472 F.2d 927 (7th Cir. 1973), does not justify reliance on the market estimates in this record. Papercraft involved a situation very different from that at bar. There, the Commission held that it was not error to deny an application for issuance of 550 subpoenas duces tecum in order to establish the total size of the market because a combination of other evidence in the record permitted an informed estimate to be made. Id. at 1404-06.

The hearing examiner in Papercraft relied on "published data of the Bureau of the Census reflecting the value of shipments" in the alleged markets, uncontradicted testimony

and other evidence identifying the principal manufacturers in the industry, and estimates by knowledgeable witnesses who had:

> "availed themselves of numerous techniques of studying the industry and the positions of their own respective firms in it, including studies based on trade journals, financial source books, census data, trade sources, and the like." Id. at 1374-75, 1415.

The situation here is radically different. There are no Census data relating to any "inhalation anesthesia market." The witnesses who gave market estimates did not, so far as the record reveals, base those estimates on "trade journals, financial source books, census data, trade sources, and the like."[1/] Moreover, the testimony concerning the identity and relative positions of the principal companies is contradicted by the returns to complaint counsel's subpoena. For example, no witness mentioned National Catheter in listing firms prominent in the alleged market, but its reported sales place it second in the industry, at least insofar as is revealed by the subpoena returns. (Figure 26; Proposed Finding 444). Hence, in Papercraft there was objective evidence to corroborate the estimates of industrial witnesses, which is absent here, and there were far better grounds for concluding that the estimates were reasonably accurate.

1/ We have no way of knowing what was the basis of the Air Products estimate testified to by Mr. Scott, as production of the underlying study for purposes of cross-examination was denied. (1357-58)

It is essential also to bear in mind the circumstances in which the issue arose in Papercraft. There an effort was made to have the hearing examiner issue 550 third-party subpoenas, purportedly in order to establish the size of the market. The hearing examiner and the Commission, reacting to what they may have viewed as a dilatory tactic, rejected that application, at least in part because there were other reasonable means to assemble the necessary information. Id. at 1404. But the Commission did not purport to hold that speculation by industry witnesses could substitute for hard evidence in all cases, irrespective to whether reliable evidence would be difficult or easy to obtain. Indeed, the Commission stated:

> "The issuance of orders requiring special written reports, or of subpoenas duces tecum to 550 companies, should obviously be undertaken only if there is no other reasonable way to develop the necessary industry data." Id. at 1405.

And the Seventh Circuit, in affirming the Commission, relied upon the fact that the estimates were based primarily on Census figures and trade association data that were consistent with the estimates of the industry witnesses. 472 F.2d at 929 and n. 5.

This case does not involve a situation even vaguely resembling Papercraft. No effort was made here to delay these proceedings by calling for the issuance of more than 500 subpoenas. Respondents identified fewer than 70 firms not subpoenaed by complaint counsel as manufacturers of products in

the two alleged medical markets. (Proposed Findings 405,449) Moreover, the parties here were able to obtain data from more than 30 third parties by subpoena without any court litigation and admitted this evidence by stipulation. Thus, there was simply no good reason for not seeking to obtain more complete industry data by subpoena, and the special circumstances of Papercraft are quite inapplicable.

Nor will it do for complaint counsel to suggest that they proved a market - it was up to respondents to add any additional sales data if they believed it relevant. For the burden is on complaint counsel - particularly when they choose to proceed wholly by statistics - to produce all the statistics.

2. In any Event, the Nature of the Alleged Product Market Makes the "Statistics and Rest" Approach Improper

Complaint counsel's "statistics and rest" approach no doubt rests on United States v. Philadelphia National Bank, 374 U.S. 321 (1963), where the Supreme Court held that an acquisition:

> "which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the [acquisition] is not likely to have such anti-competitive effects." 374 U.S. at 363.

Even if it be assumed that the statistics in the record are accurate as far as they go, this is not an appropriate case for application of the rule of Philadelphia National Bank.

Market share data concerning the inhalation anesthesia market are far less reliable indicators of likely competitive effects than might be the case in a more homogeneous market. As we have seen, the statistics are of little use in assessing relative competitive strengths of firms in the market because most of the firms make only a few of the many diverse products included. Thus, to say that National Catheter is the second-ranking firm in the inhalation anesthetic equipment market and that it has a market share of [D 62](Figure 26) provides little information in light of the fact that it produces only disposable endotracheal tubes and therefore cannot be said to be a competitor of many of the firms in the market.

The Supreme Court recently reassessed the rule of Philadelphia National Bank in United States v. General Dynamics Corp., ___ U.S. ___, 39 L.Ed.2d 530 (1974). While the Court acknowledged the quoted language from Philadelphia National Bank, it stated:

> "In Brown Shoe v. United States, supra, we cautioned that statistics concerning market share and concentration, while of great significance, were not conclusive indicators of anticompetitive effects:
>
> > '... Congress indicated plainly that a merger had to be functionally viewed, in the context of its particular industry . . . . Statistics reflecting the shares of the market controlled by the industry leaders and the parties to the merger are, of course, the primary index of market power; but only a further examination of the particular market -- its structure, history and probable future -- can provide the appropriate setting for judging the probable anticompetitive effect of the merger.' 370 US at 321-322, 8 L Ed 2d 510, 82 S Ct 1502 and n 38." (39 L.Ed.2d at 542.)

The peculiar nature of this market -- composed as it is of a large number of manufacturers, most making only a few of the broad range of non-homogeneous products included -- makes market share and concentration data uninformative as to the probable effects of an acquisition, even if it were reliable. In this case, the "statistics and rest" approach ignores the real "structure, history and probable future" of the alleged market. And so the statistics alone will not do.

3. This Acquisition Is Lawful in any Event

Even if it be assumed that the "statistics and rest" approach may properly be applied here and that the statistics in the record are sufficiently complete and reliable to warrant their use, no violation of Section 7 in the alleged inhalation anesthetic equipment market has been demonstrated.

Given the wide range of possibilities in defining the alleged market, such as including or excluding dental, veterinary or monitoring equipment, it is difficult to decide which of the numerous market share statistics is appropriate for measuring this acquisition against the Philadelphia National Bank standard. Nevertheless, even the market share data most favorable to complaint counsel demonstrate the lack of a violation.

The highest market share that may be computed for Ohio Medical Products is its share of a market consisting of human anesthetic equipment and accessories, but excluding respirometers and other monitoring equipment --[D 63]. (Figure 25) Fraser Sweatman's and Harris Lake's shares of the market so defined are [D 64] and [D 65], respectively. (Figure 25) Hence, the combined market shares of the three total [D 66], an increase of [D 67] over Ohio's share alone.

The cases decided by the Supreme Court under the Philadelphia National Bank standard have not condemned an acquisition of this magnitude in comparable circumstances. In Philadelphia National

Bank itself, supra, 374 U.S. 321, the Court held that 30% of the market was "an undue percentage share" and that a one-third increase in the concentration of business in the market's two largest firms, which already had more than 50% of the market, was "a significant increase in the concentration of firms in that market." Id. at 363. But here, combination of Ohio, Fraser Sweatman and Harris Lake does not produce a 30% market share. Moreover, the total sales of the combination are less than 12% higher than Ohio alone -- hardly comparable to the one-third increase in the concentration in the two largest firms found in Philadelphia National Bank.

There are only four decisions of the Supreme Court since Philadelphia National Bank that apply its presumption to acquisitions involving market shares as small as those involved here, and all of those are distinguishable.

In United States v. Continental Can Co., 378 U.S. 441 (1964), the acquiring firm had a market share of 21.9% and the acquired firm a share of 3.1%. Id. at 461. But the market involved in that case was highly concentrated, as the six largest firms had a total of 70.1% of the business. Ibid. Here the concentration ratio, even if calculated on the basis of the figures in the record most favorable to complaint counsel, is substantially less.[1/]

1/ [D 68]

In United States v. Aluminum Company of America, 377 U.S. 271 (1964), the Supreme Court held unlawful Alcoa's acquisition of Rome Cable, despite the latter's 1.3% market share. But there the top two firms had over 50% of the market, the top five over 76%, and the top nine over 95%. Id. at 278. Hence, the aluminum conductor market involved in Alcoa was also far more concentrated than that at issue here.

Finally, mergers in the beer and supermarket industries involving market shares smaller than those involved in this case were held unlawful in United States v. Pabst Brewing Co., 384 U.S. 546 (1966), and United States v. Von's Grocery Co., 384 U.S. 270 (1966). But the Court rested its holdings in those cases on trends toward increasing concentration in the markets involved. Here there is no evidence of increasing concentration in the anesthetic equipment field. Indeed, the evidence is to the contrary, as the record shows that both Dupaco and North American Draeger have entered the field in recent years while no firms have left it.

Another factor indicates that BOC's acquisition of an interest in Airco is unlikely to have the prohibited anti-competitive effects in the anesthetic equipment market. As we have seen, entry into this business is not difficult. The industry is not capital-intensive like the industrial gas business, there is no need to manufacture a full line of products, and the production technology is commonplace. Hence, any effects of undue concentration would be mitigated by ease of entry into the industry.

Just such considerations have led at least one court to uphold a merger even where the combined market shares of the merging firms exceeded the 30% level of Philadelphia National Bank. United States v. Tidewater Marine Service, Inc., 284 F. Supp. 324 (E.D. La. 1968). See also, e.g., American Crystal Sugar Co. v. Cuban-American Sugar Co., 152 F. Supp. 387 (S.D.N.Y. 1957), aff'd on other grounds, 259 F.2d 524 (2d Cir. 1958).

Since the combined shares of the alleged inhalation anesthetic equipment market of Ohio, Fraser Sweatman and Harris Lake are below the level established in Philadelphia National Bank; since there are no special circumstances warranting application of a lower standard, such as high concentration or a trend toward increased concentration; and since the alleged market is easily entered, complaint counsel have failed to demonstrate the probability of significant anti-competitive effects in this alleged market.

B. Inhalation Therapy Equipment

While everything said thus far with respect to the alleged inhalation anesthetic equipment market is fully applicable to the alleged inhalation therapy equipment market, we must not lose sight of the overriding consideration with respect to the latter. This acquisition is not likely to have

anti-competitive effects in the inhalation therapy field because Ohio, on the one hand, and Fraser Sweatman and Harris Lake, on the other, are not competitors in that alleged market. The two BOC subsidiaries simply make no inhalation therapy products except for, arguably, the Wright respirometer. And Ohio does not make respirometers.

Even a simplistic market share analysis based on Harris Lake's sales of Wright respirometers cannot alter this inescapable conclusion. If half of Harris Lake's sales of that product were classified as inhalation therapy equipment, its share of that estimated $85 million market would be [D69]. Nor is Ohio a powerhouse: on the view of the evidence most favorable to complaint counsel, its share of the alleged inhalation therapy equipment market was [D 70]in 1973 (Proposed Finding 475), a figure which placed it sixth, far behind the leading firm.[1/] There is simply no authority for holding unlawful a combination of two such relatively insignificant market factors. E.g., United States v. Crowell, Collier and MacMillan, Inc., 361 F. Supp. 983 (S.D.N.Y. 1973).

Accordingly, the complaint should be dismissed as to the alleged inhalation therapy equipment market.

1/ [D 71]

PART III

PROPOSED CONCLUSIONS OF LAW
AS TO THE ENTIRE CASE

Industrial Gases

1. Complaint counsel have failed to demonstrate that BOC was a perceived potential entrant exerting a pro-competitive effect from the fringes of the industry because:

(a) BOC was not perceived as reasonably likely to enter by any significan segment of the industry; and

(b) the competitive behavior of the industrial gas industry was not affected by BOC in any event.

2. Complaint counsel have failed to show that BOC was an actual potential entrant whose entry would have been likely to lead to further deconcentration of the industrial gas industry or other significant pro-competitive effects because:

(a) BOC was not likely to enter the industry other than by acquisition of an interest in Airco; and

(b) in any event, there was no showing that de novo or toehold entry by BOC would have improved competition in the industry.

3. The doctrine of potential competition does not apply to the United States industrial gas industry because:

(a) The industrial gas industry is not sufficiently concentrated to make a prima facie case for application of the potential competition doctrine; and

(b) in any event, the industry is "genuinely competitive" and the doctrine is therefore inapplicable.

4. BOC's acquisition of an interest in Airco will leave competition in the alleged industrial gas market exactly as it was prior to the acquisition, and the acquisition therefore does not violate Section 7 of the Clayton Act, irrespective of whether BOC would have entered the industry otherwise, and irrespective of whether such other entry would have had pro-competitive effects.

5. Complaint counsel have failed to demonstrate prohibited anti-competitive effects in a relevant product market because "industrial gases" is not a relevant line of commerce within the meaning of Section 7.

6. Complaint counsel have failed to demonstrate prohibited anti-competitive effects in any relevant geographic market.

Medical Equipment

7. Complaint counsel have failed to prove a relevant medical product market because neither "inhalation anesthetic equipment and accessories" nor "inhalation therapy equipment and accessories" is a relevant line of commerce within the meaning of the Clayton Act.

8. Assuming that inhalation anesthetic equipment and accessories is a relevant line of commerce, complaint counsel have failed to prove that BOC's acquisition of an interest in Airco may substantially lessen competition or tend to create a monopoly in that market because:

(a) the statistical evidence offered by complaint counsel is so incomplete and unreliable as to make reliance upon it improper; and

(b) in any event, the statistical evidence is insufficient to demonstrate a likelihood of the prohibited anti-competitive effect.

9. Assuming that inhalation therapy equipment and accessories is a relevant line of commerce, complaint counsel have failed to prove that BOC's acquisition of an interest in Airco may substantially lessen competition or tend to create a

monopoly in that market because:

(a) the statistical evidence offered by complaint counsel is so incomplete and unreliable as to make reliance upon it improper; and

(b) in any event, the statistical evidence is insufficient to demonstrate a likelihood of the prohibited anti-competitive effect.

General

10. Inasmuch as complaint counsel offered no evidence with respect to the alleged pipeline systems market and the alleged electrical welding and gas welding and cutting market, the complaint has not been sustained and therefore should be dismissed with respect to these alleged markets.

11. Complaint counsel have failed to prove that the effect of BOC's acquisition of an interest in Airco may be substantially to lessen competition, or tend to create a monopoly in any line of commerce in any section of the country.

12. Complaint counsel have failed to prove that the BOC respondents violated Section 5 of the Federal Trade Commission Act.

13. The complaint should be dismissed in its entirety as to all respondents.

PART IV

PROPOSED ORDER

IT IS ORDERED, that the complaint be, and the same hereby is, dismissed.

Respectfully submitted,

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Dated: New York, New York
August 2, 1974

UNITED STATES OF AMERICA

BEFORE FEDERAL TRADE COMMISSION

DOCKET NO. 8955

In the Matter of

BRITISH OXYGEN COMPANY, LIMITED, et al.

AIRCO'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND BRIEF

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TABLE OF CONTENTS

		Page
Table of Authorities.		i
I.	Proposed Findings of Fact.	1
	A. Identity and Business of Airco	1
	B. Airco Becomes a Target	3
	C. Initial Discussions with BOC	4
	D. Curtiss-Wright's First Offer	8
	E. Curtiss-Wright Comes Back.	10
	F. Further Discussions with BOC; Airco's Consent.	11
	G. BOC's Tender Offer	13
	H. Airco's Present Position	14
II.	Legal Analysis	15
	A. Introduction and Summary	15
	B. Complaint Counsel Failed to Establish a Section 7 Violation by BOC	16
	1. No Lessening of Potential Competition Has Been Shown in the Alleged Industrial Gas Market	17
	a. No Product or Geographic Markets have been shown	17
	b. BOC Was Not a Perceived Potential Entrant Exerting a Procompetitive Effect or an Actual Potential Entrant.	20
	2. No Lessening of Competition Has Been Shown in the Two Medical Products Markets.	26

Page

C. Complaint Counsel Did Not Prove That Airco Violated Section 5 30

III. Proposed Conclusions of Law. 39

TABLE OF AUTHORITIES

Cases:	Page
Allen v. Biltmore Tissue Corp., 2 N. Y. 2d 534, 141 N. E. 2d 812, 161 N.Y.S. 2d 418 (1957). .	35
Brown Shoe Co. v. United States, 370 U.S. 294 (1962)	20
Crown Zellerbach Corp. v. F.T.C., 296 F.2d 800 (9th Cir. 1961), cert. denied, 370 U. S. 937 (1962)	18
Dean Foods, Co., 70 F.T.C. 1146 (1966)	15, 36
F.T.C. v. Sperry & Hutchinson Co., 405 U.S. 233 (1972)	32
General Mills, Inc., 80 F.T.C. 985, 3 Trade Reg. Rep. (1974 Trade Cas.) ¶ 20,457 at 20,360 (1973) .	22
Lockley v. Robie, 276 App. Div. 291, 94 N.Y.S. 2d 335 (4th Dept.), modified on other grounds, 301 N.Y. 371, 93 N.E. 2d 895 (1950).	35
Missouri Portland Cement v. Cargill, 5 Trade Reg. Rep. (1974 Trade Cas.) ¶ 75,113 at 96,956 (2d Cir. June 10, 1974), petition for cert. filed, 43 U.S.L.W. 3017 (U.S. July 23, 1974)(No. 73-2014). .	25
National Petroleum Refiners Association v. F.T.C., 482 F.2d 672, (D.C. Cir. 1973), cert. denied, 39 L. Ed. 2d 567 (February 25, 1974).	31
Pfizer, Inc., 81 F.T.C. 23 (1972).	32
Sterling Drug Co., 80 F.T.C. 477, [1970-73 Transfer Binder] Trade Reg. Rep. ¶ 19,961 at 21,969 (1972).	18, 20, 29
United States v. du Pont & Co., 353 U.S. 586 (1957)	20

Cases: Page

United States v. Falstaff Brewing Corp., 410 U.S. 526 (1973) 23

United States v. General Dynamics Corp., 5 Trade Reg. Rep. (1974 Trade Cas.) ¶ 74,967 at 96,301 (U.S. March 19, 1974) 21

United States v. Marine Bancorporation, 5 Trade Reg. Rep. (1974 Trade Cas.) ¶ 75,125 at 97,028 (U.S. June 26, 1974) 20, 21, 22, 24, 25

Statutes and Regulations:

Section 7 of the Clayton Act, 15 U.S.C. §18 (1970) 16

Section 5 of the Federal Trade Commission Act, 15 U.S.C. §45(a)(1) (1970) 30

Williams Act, §13(d)-(e), 15 U.S.C. §78m(d)-(e) (1970) 34

Miscellaneous:

Aranow & Einhorn, Tender Offers for Corporate Control, (1973) 35

Committee on Banking and Currency, Full Disclosure of Corporate Equity Ownership and In Corporate Takeover P S. Rep. No. 550, 90th Cong., 1st Sess. 1-4 ...7) 34-35

Executive Office of the President, Office of Management and Budget, Standard Industrial Classification Manual 1972 (1972) 18

12 Fletcher Cyc. Corp. §5461.6 at 214 (Perm. Ed. 1971) 35

Miscellaneous: Page

Handler, Twenty-five Years of Antitrust, 73 Colum. L. Rev. 415 (1973). 39

Statement of Basis and Purpose of Trade Regulation Rule 408, Unfair or Deceptive Advertising of Cigarettes in Relation to the Health Hazards of Smoking, 29 Fed. Reg. 8355 (1964). 32

Turner, Conglomerate Mergers and Section 7 of the Clayton Act, 78 Harv. L. Rev. 1313 (1965). 22

United States v. Falstaff Brewing Corporation: Potential Competition Re-examined, 72 Mich. L. Rev. 837 (1974) 22

Abbreviations Used Herein:

CX - Complaint Counsel's Exhibits
RAX - Respondent Airco's Exhibits
APF - Airco's Proposed Findings
BPF - BOC's Proposed Finding
Tr. - Transcript Colloquy
Name Number - Testimony of Witness and Trascript page number

A 687

UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION

In the Matter of	:	
BRITISH OXYGEN COMPANY, LIMITED, BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, BRITISH OXYGEN INVESTMENTS, LIMITED AIRCO, INCORPORATED	:	Docket No. 8955

TO:
THE HONORABLE ERNEST G. BARNES,
ADMINISTRATIVE LAW JUDGE

AIRCO'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND BRIEF

Pursuant to Section 3.46 of the Commission's Rules of Practice for Adjudicative Proceedings, Airco, Inc. ("Airco"), respectfully submits these proposed Findings of Fact and Conclusions of Law Relating to Airco in the above-captioned proceeding.

I. Proposed Findings of Fact

A. IDENTITY AND BUSINESS OF AIRCO

1. Airco (formerly known as the Air Reduction Company Incorporated) is now and was in 1973 a New York corporation with its executive offices at 85 Chestnut Ridge Road, Montvale, New Jersey. (Complaint and Airco Answer ¶ 16, CX-177-B) Airco has and had 11 operating

divisions each with its own separate management engaged in the manufacture and sale of industrial gases, cryogenic equipment, welding and cutting equipment, carbon-graphite products, electronics, specialized metal products, metals, calcium carbide, high-vacuum equipment and medical gases and equipment. (Complaint and Airco Answer ¶ 17, Dillon 2584, CX-177-K, CX-177-M, CX-177-Q, CX-177-T, CX-177-Y, CX-177-Z-2, CX-177-Z-5, CX-177-Z-7, CX-177-Z-9, CX-177-Z-10)

2. Airco's industrial gas and medical products businesses account for approximately 35% of Airco's total sales and comprise approximately 32% of the Company's total investment. The industrial gas business is done primarily through an industrial gas division with some gases also being sold by the welding products, medical products and carbide divisions. The medical products business is done entirely through the Ohio Medical Products Division. (CX-177, RAX-7, Giordano 1897-1903, Dillon 2583-2584, Cosgrove 2282-2283)

3. Airco's common stock is and was traded on the New York and Pacific Coast Stock Exchanges. In June of 1973 approximately 11.4 million shares of common stock were outstanding (CX-177-Z-18, CX-177-D, CX-125-Z-14, Dillon 2585) with 43,000 shareholders of record. (Dillon 2585, RAX-7, p. 1) The largest

single holder held approximately 3% of the outstanding common stock. (Dillon 2586) At that time the stock was trading at approximately $11 per share, had a book value of $23 per share and a price earnings ratio (based on the prior published four quarters) of eight which Airco forecast to be reduced to approximately 6.5 for the year 1973. (Dillon 2585-2586)

B. AIRCO BECOMES A TARGET

4. During 1973 Airco's stock sold at the lowest prices and price-earnings ratios it had been selling at in over five years. (RAX-7, p. 51, CX-125-Z-14) Because of stock market conditions in general and the status of Airco stock in particular, Airco felt that it was vulnerable to a tender offer from some other company. (Giordano 2033-2034) During this period there were numerous rumors of tender offers and takeover bids and Airco was frequently rumored to be the target of such efforts. (Dillon 2586)

5. During June, 1973 American and British investment bankers visited a number of companies to stimuate them to invest in American companies. (Laister 2623-2624) One of the companies the investment bankers

suggested as a particularly attractive target for a take-over bid was Airco. (Laister 2540-2541) At that time the investment bankers stated that Airco was going to be the target of a takeover bid. (Laister 2541)

6. To enable Airco to have available the maximum number of alternative choices in the event that a tender offer was forthcoming and so that Airco's Board could exercise a judgment for their shareholders as to the merits of any tender offer with the least amount of pressure on the decision, Airco updated an old plan for responding to a tender offer. (Dillon 2587) Airco's Board felt it had a duty in any tender offer to express a view on the adequacy of the price offered for the stock and whether significant stock ownership by the company making the offer would be helpful or harmful to the future conduct of Airco's business. (Dillon 2607-2608)

C. INITIAL DISCUSSIONS WITH BOC*

7. Over the years prior to 1973, Airco and BOC had had a number of commercial contacts. As a result of these contacts, various members of the senior managements of BOC and Airco became acquainted with one another. (Dillon 2585, Giordano 1933-1936, Laister 2537, Smith 1721)

* The British Oxygen Company, Limited, BOC Financial Corporation, British Oxygen Investments Limited and BOC Holdings Limited are referred to collectively herein as "BOC".

8. BOC learned in June 1973 of the rumors relating to an impending takeover bid for Airco. (Laister 2541) Shortly thereafter, a managing director of BOC discussed Airco's vulnerability to such a bid with a Vice-President of Airco during a social occasion. (Smith 1721, Laister 2542-2543)

9. Because of Airco's concern about its vulnerability to a tender offer, Airco had its President contact the Chairman of BOC during the President's next visit to Europe to determine the basis for the statements made by the BOC managing director and to explore whether BOC was interested in a closer association with Airco. (Giordano 2033-2034) Airco's President and BOC's Chairman decided that a meeting of senior managers would be held to acquaint Airco and BOC with the nature of the other's business and to exchange preliminary financial information respecting the two companies. (Giordano 1972, CX-78-A, Laister 2546-2547)

10. A meeting was scheduled in New York starting on July 25, 1973 between working parties of senior executives from Airco and BOC. (CX-86) Prior to attending the meeting both sides prepared information relating to their sales, profits and capital investments which was to serve as a basis for discussions at the July 25 meeting. (CX-301, RAX-83)

11. Prior to the exchange of information, BOC and Airco entered into an agreement dated July 25, 1973 which contained the following provisions:

> "Each of us has accepted and will accept and keep such information in confidence and has restricted and will restrict its distribution to those of our respective employees and agents who need to know such information for the purpose of evaluating the other's business and who have been informed of the terms and conditions of this understanding as to the confidential nature and treatment of the information and directed to comply therewith.
>
> "The information will be held in confidence and not disclosed to any third parties (including our respective affiliates) for a period of five years from the date of this letter, and each of us will take necessary and reasonable precautions to prevent any such disclosure during that period, and to destroy or return all copies of such information and of documents incorporating any substantial part thereof as and when requested by the other party. During the same five year period, neither of us will use such information for commercial purposes without the written consent of the other party."
>
> * * *
>
> "[I]t is agreed that, except with the prior approval of the Board of Directors of the other party, neither party will make, or authorize or permit any of its affiliates to make, a tender, exchange or other offer for any securities of the other for a period of five (5) years from the date of this letter."

(CX-99) (emphasis added)

Airco sought and obtained this agreement because of the confidential nature of the information to be exchanged and because such financial information might help another company evaluate whether, and at what price, to make a tender offer for Airco stock. (Giordano 1972-1973)

12. At the July 1973 meeting Airco and BOC exchanged historical and current information relating to sales, profits and capital employed. BOC also provided to Airco some previously completed five year forecasts for the BOC Group. (CX-301, Laister 2547) Airco produced for BOC some arithmetic extrapolations of its present sales to the year 1978 based solely on current estimates of market share and projected industry growth. (RAX-83, Giordano 1975, Laister 2549) No customer lists, trade secrets, formulas, know-how, manufacturing process or confidential business information was exchanged between Airco and BOC. (Giordano 1976-1977) During the meeting a number of problems, relating to any possible closer association between Airco and BOC, were identified for consideration at future meetings. (CX-127, Laister 2549-2550)

13. In September and October the Chairmen of Airco and BOC had two wide-ranging discussions on the

possible forms of closer association and the merits of each. (CX-95, CX-98)

D. CURTISS-WRIGHT'S FIRST OFFER

14. Consideration of the problems identified at the July meeting was interrupted when, on November 2, 1973, the Chairman of Curtiss-Wright Corporation informed Airco's senior officers that his company was prepared to make a tender offer for 2 million Airco shares at a price 25% over the then market price, or approximately $16-$17 per share. (Dillon 2588, 2611) Airco's executives responded by stating that they would have to convene a meeting of the Airco Board of Directors to consider the Curtiss-Wright proposal and consult their advisers before making a substantive response to the Curtiss-Wright statement. (Dillon 2589)

15. Airco conducted an intensive study of Curtiss-Wright with the assistance of Airco's investment bankers, accountants and internal staff (Dillon 2589-2590) and invited Curtiss-Wright to make a presentation to the Airco Board of Directors about the proposed tender offer. At the time of the Board meeting the various Airco advisers had concluded that the price to be offered by Curtiss-Wright was inadequate and that Airco's

business would be harmed by a closer association with Curtiss-Wright because, among other reasons, Curtiss-Wright's operating earnings and capital expenditures had steadily declined, because their reputation as a supplier to the aviation industry was on the decline, and because they had no success in assisting the companies they acquired. (Dillon 2592-2594) Airco had also concluded that a successful Curtiss-Wright offer would effectively preclude any closer association with any other company, including BOC. (Dillon 2599)

16. Airco's Board of Directors heard a presentation from Curtiss-Wright's Chairman as well as presentations from the Chairman of British Oxygen Company and the Chairman of Southern Natural Resources. (Dillon 2594, 2591) The latter two companies were invited to address the Board because they indicated that they were both considering an offer for Airco stock, although they were unable to make a specific proposal at that time. (Dillon 2594-2596) Airco's Board of Directors concluded that an offer by Curtiss-Wright at a price of $18 or less should be opposed. (Dillon 2594) Airco's Board also decided to reconvene to consider any definitive offer from BOC or Southern Natural Resources. (Dillon 2594-2595)

17. Airco's Chairman informed Curtiss-Wright's Chairman of the decision by the Airco Board and the latter responded that Curtiss-Wright would not make the offer under those circumstances. (Dillon 2595, Laister 2551)

18. Airco and BOC thereafter returned to a study of the various problems identified in July which had to be resolved prior to any decision about a closer association between the two companies. (Smith 1725, Dillon 2595-2596) Working parties were set up to examine the various forms of closer association and to isolate the problems. (Dillon 2595-2596) At that time it was anticipated that additional meetings would take place after the first of the year, 1974. (Dillon 2596)

E. CURTISS-WRIGHT COMES BACK

19. On December 3, 1973 Curtiss-Wright, without additional consultations or discussions with Airco, made a public tender offer for 2.4 million shares of Airco's common stock at $18 per share. (Dillon 2594-2598, 2601, CX-125-Z-14) Airco notified BOC of the Curtiss-Wright offer. (Laister 2551, Dillon 2597)

20. Pursuant to the previously obtained Board authorization, Airco opposed the Curtiss-Wright tender

offer (Dillon 2596-2597) and recommended that Airco's shareholders not accept it. (Dillon 2606, Giordano 2013-2014) On December 4, 1973 Airco sent a letter to its shareholders urging them to reject the Curtiss-Wright offer and asking them to wait to consider possible alternatives to that offer. (CX-125-Z-9)

F. FURTHER DISCUSSIONS WITH BOC; AIRCO'S CONSENT

21. At the same time Airco intensified discussions with BOC concerning BOC's interest in a closer association with Airco because Airco expected BOC would offer the Airco shareholders a higher price and because, in Airco's view, BOC was a far better prospective partner than Curtiss-Wright. (Giordano 2013, Dillon 2598, Smith 1727, Laister 2551-2552) BOC decided to make a tender offer for Airco stock at $20 per share. (Laister 2552)

22. Prior to and as a condition to Airco's Board granting its consent under the terms of the July 25 agreement to a limited tender offer by BOC, Airco obtained significant limitations on BOC's actions and protections for Airco's shareholders that were incorporated in an agreement dated December 10, 1973. (Dillon 2600-2601) Under that agreement Airco only consented to the specific tender offer BOC made on December 10, 1973. (CX-108-A ¶ 1) By its terms

that offer limited BOC to purchasing no more than 4 million Airco shares at $20 per share. (CX-125-Z-10) Unless some person other than BOC acquired 20% of Airco's stock or some new tender offer was filed for Airco stock, the limitation in the July 25 agreement on BOC making any other offer for Airco stock "continued in full force and effect." (CX-108-A)

23. The December 10, 1973 agreement between Airco and BOC also provided additional protections for Airco and its shareholders as follows:

> "Airco agrees that so long as BOC holds or owns directly or indirectly 1,000,000 or more of the outstanding shares of Airco, the Board of Directors of Airco, at each meeting of shareholders of Airco for the election of directors, will nominate persons recommended by BOC in the number which bears the same relationship to the total number of persons to be nominated as the number of shares of common stock of Airco held by BOC bears to the total number of outstanding shares of common stock of Airco.
>
> In the event that BOC directly or indirectly acquires 2,400,000 or more of the outstanding shares of Airco, BOC has the intention of inviting George S. Dillon and Richard V. Giordano to become members of the Board of Directors of BOC.
>
> BOC or any BOC subsidiary or associate company will not transfer, except to BOC or a BOC subsidiary or associate company (by sale, assignment, or other disposition), any Airco shares owned by it, without first giving Airco the right within a reasonable period of time to purchase or designate a purchaser for such shares in whole, for cash in an amount equivalent in value to the consideration for which BOC Financial or such subsidiary or associate of BOC proposes to sell such shares to the proposed transferee." (CX-108-A) (emphasis added)

24. The December 10 agreement was important for Airco's shareholders because it reaffirmed and reinforced that BOC could not in the future acquire any Airco shares above 4 million without the consent of Airco. (Dillon 2600) In addition the agreement limited the number of BOC representatives on Airco's Board and gave Airco a direct voice in the management of BOC, Airco's largest shareholder. Finally, the agreement gave Airco the very important right, if BOC decides to transfer its Airco shares, to purchase or designate a purchaser for those shares. (Dillon2600-2601)

G. BOC'S TENDER OFFER

25. On December 10, 1973 BOC made a tender offer to shareholders of Airco for up to 4 million shares of Airco common stock at $20 per share. (CX-125) Airco's Board of Directors permitted Airco's transfer agent to mail, at BOC's expense, the BOC tender offer to Airco's shareholders so that they would have sufficient time to consider the $20 offer from BOC prior to having to decide whether to tender their shares at $18 to Curtiss-Wright whose offer had already been pending for one week. (Dillon 2602, Giordano 2014)

26. Airco's Board did not recommend that Airco's shareholders accept the BOC offer or endorse its

price or terms. Airco's Board believed each shareholder should make his own decision concerning BOC's offer. (CX-125-Z-9, Dillon 2601-2602, 2605, Giordano 2014) Airco itself sold none of its shares to BOC and neither did its Chairman or President. (Dillon 2605, Giordano 2017)

27. The BOC tender offer was oversubscribed (Smith 1727) and pursuant to its terms the shareholders who tendered to BOC had their tenders pro-rated. (CX-125-Z-10) As a result, Airco had approximately the same number of shareholders after the tender offer as it did prior to the offer. (Dillon 2602, RAX-7)

28. After completion of the BOC tender offer, Airco expanded its Board of Directors from 12 to 16 members and elected 4 BOC representatives to fill the newly created vacancies. (RAX-7 p. 3, Giordano 2015-2016)

H. AIRCO'S PRESENT POSITION

29. Airco and BOC have considered various forms of closer association. However at the time of trial, and quite apart from the pendency of this proceeding, the problems raised in July of 1973 have not been resolved. (Dillon 2602-2603, Laister 2616-2617)

II. Legal Analysis

A. Introduction and Summary

The complaint charges Airco with a violation of Section 5 of the Federal Trade Commission Act.* This claim is based exclusively on two agreements between Airco and BOC, dated July 25 and December 10, 1973. The July 25 agreement precluded BOC from acquiring any Airco shares and the December 10 agreement permitted BOC to purchase from the public up to but no more than four million (approximately 35%) of Airco's outstanding shares.

Complaint counsel have conceded that if they are unable to establish a violation of Section 7 of the Clayton Act by BOC, then no violation by Airco of Section 5 of the Federal Trade Commission Act can be found. (Tr. 463-467)

It is Airco's contention that: (1) no Section 7 violation can be found so there has been no Section 5 violation; and (2) even if BOC is found to have violated Section 7, still no Section 5 violation by Airco can be found.

* The complaint is ambiguous as to whether Airco is also charged with a violation of Section 7 of the Clayton Act (see complaint, para. 28). However, complaint counsel did not make such contention during the hearing (Tr. 462-464) and any such allegation is unfounded. See, e.g., Dean Foods Co., 70 F.T.C.1146, 1290 (1966).

With respect to the staff's Section 7 contention, respondent Airco will principally rely upon the proposed findings of fact, conclusions of law and brief submitted by the BOC respondents. Airco will, however, briefly summarize its position in this regard and will then present its contentions in respect to the Section 5 charge.

B. Complaint Counsel Failed to Establish a Section 7 Violation by BOC

Section 7 of the Clayton Act provides as follows:

> "That no corporation engaged in commerce shall acquire directly or indirectly, the whole or any part of the stock or other share capital and no corporation subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another corporation engaged also in commerce, where in any line of commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly." 15 U.S.C. §18

The complaint herein alleges there were Section 7 violations in four alleged lines of commerce industrial gases, inhalation anesthetic equipment, inhalation therapy equipment, and medical pipeline systems.* During the course of pretrial, complaint counsel withdrew any allegations with respect to the medical pipeline systems market. (Tr. 135) Thus, three national product markets remain in contention.

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* Complaint counsel during a pretrial conference disavowed any claims relating to a welding equipment market despite the allegations of paragraph 27(f) of the Complaint. (Tr. 135)

Complaint counsel conceded that BOC was not engaged in the industrial gas business in the United States and predicated their contention that a violation occurred in this market on the doctrine of potential competition. On the other hand, complaint counsel contended that BOC, through two recently acquired subsidiaries, was actually engaged in the inhalation anesthetic equipment and inhalation therapy equipment markets in the United States and that in these alleged lines of commerce BOC's acquisition of Airco stock substantially lessened actual competition.

1. No Lessening of Potential Competition Has Been Shown in the Alleged Industrial Gas Market

Complaint counsels' claims about the industrial gas market are defective because (a) no product or geographic markets were established and because (b) BOC was neither a perceived potential entrant which exerted a procompetitive effect by its presence outside the market, nor an actual potential entrant.

a. No Product or Geographic Markets Have Been Shown

The record herein indicates that industrial gases is neither a single product nor a national market.* While the evidence shows that witnesses from the industry use the term "industrial gases", they each use it in a different fa-

* Complaint counsel has specifically disavowed any intention of seeking to prove violations in any product or geographic sub-market. (Tr. 278)

shion and most simply to designate those gases which his company marketed. Such a catch-all phrase cannot be used as the predicate for finding a product market. See Sterling Drug, Co., 80 F.T.C. 477, [1970-73 Transfer Binder] Trade Reg. Rep. ¶ 19,961 at 21,969, 21,976 (1972).*

It is clear that except for the atmospheric gases the gases encompassed within the generic term industrial gases as used by complaint counsel are produced in significantly different fashions. Furthermore, uses for these gases, ranging from combustion, to freezing, to breathing, are as varied as their means of production.

Reflecting these facts, the gases are marketed in entirely different fashions. For example, the two companies selling the largest quantities of carbon dioxide, namely Liquid Carbonic and Chemetron, do so through divisions entirely separate from the rest of their industrial gases, whereas the two largest companies in the industrial gas field, Union Carbide and Air Products, sell virtually no carbon dioxide at all. (BPF 91, 78)

The record also clearly shows great variances in delivery methods of the same gases to different customers and for different uses. Thus, the enormous users of industrial

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* The Standard Industrial Classification cannot be used as a predicate for a product market without a showing of the basis for the classification, particularly where the SIC category used differs from the Complaint's definition of industrial gas. Compare Complaint ¶ 1(a) with CX-296, CX-300 and Office of Management and Budget, Standard Industrial Classification Manual 1972 111 (1972). See Crown Zellerbach Corp. v. F.T.C. 296 F.2d 800, 807 (9th Cir. 1961), cert. denied, 370 U.S. 937 (1962).

gases purchase such in gaseous form delivered through pipelines. These consumers, such as the steel companies, in reality purchase the construction of and output from an air separation plant, rather than just specific product.

Other large users, whose consumption does not justify the construction of a plant, purchase industrial gases in bulk liquid form delivered by rail or truck. Finally, the small or retail user will purchase such gases in gas form in small cylinders.

The means of production and delivery to these three different types of customers, the uses to which the gases are then put, and the prices charged, are so disparate that any line of commerce attempting to encompass more than one of them has no economic validity.

Unanimous testimony throughout the hearing also showed the geographic radius of effective competition is as disparate as the uses of the various gases. Helium is shipped across oceans while tonnage oxygen is limited by the length of a pipeline. Merchant oxygen and nitrogen from an air separation plant are usually sold within a 250 mile radius while argon from the same plant can be economically sold across the country. Different producers engage in separate geographic markets and no evidence was introduced to indicate any characteristics of these markets, much less any lessening of any competition therein.

In short, complaint counsel failed to establish that industrial gases constitute either a relevant product market or, if such a market did exist, that it was a national rather than a number of regional markets. This failure in and of itself constitutes grounds for dismissal of the complaint. See United States v. Marine Bancorporation, 5 Trade Reg. Rep. (1974 Trade Cas.) ¶75,125 at 97,028 (U.S. June 26, 1974); United States v. du Pont & Co., 353 U.S. 586, 593 (1957); Brown Shoe Co. v. United States, 370 U.S. 294, 324 (1962); Sterling Drug, supra.

b. BOC Was Not a Perceived Potential Entrant Exerting a Procompetitive Effect or an Actual Potential Entrant

Complaint counsel contend that BOC was a potential entrant that had some substantive procompetitive effect on the industrial gas market simply by its perceived existence outside such market, and that BOC as an actual potential entrant would have entered the market de novo or by a "foothold" acquisition if it had not acquired an interest in Airco, and would thereby have increased competition.

The Supreme Court has recently stated the factors to be used in determining the specific effect upon the pre-merger market a perceived potential entrant must have before a merger involving it violates Section 7 of the Clayton Act:

> "In developing and applying the doctrine [of potential competition], the Court has recognized that a market extension merger may be unlawful if [1] the target market is substantially concentrated, [2] if the acquiring firm has the characteristics, capabilities and economic incentive to render it a perceived potential de novo entrant and [3] if

> the acquiring firm's premerger presence on the fringe of the target market in fact tempered oligopolistic behavior on the part of existing participants in the market. In other words, the Court has interpreted §7 as encompassing what is commonly known as the 'wings effect' - the probability that the acquiring firm prompted premerger procompetitive effects within the target market by being perceived by the existing firms in the market as likely to enter de novo." United States v. Marine Bancorporation, supra, at 97,031.

The Court went on to analyze the prerequisites for application of the doctrine of perceived potential entry and said:

> "[t]he doctrine comes into play only where there are dominant participants in the target market engaging in interdependent or parallel behavior and with the capacity effectively to determine price and total output of goods or services". Id. at 97,033

The testimony showed that the industrial gas business is not an oligopolistic market where the sellers are able to maintain prices above a competitive level*. Clear evidence showed extremely low rates of return and declining unit prices.

The capital intensive nature of the industry and

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* In that regard complaint counsel seem to rely solely on concentration ratios. Wholely apart from the economic unreality of this approach (See United States v. General Dynamics Corp., 5 Trade Reg. Rep. (1974 Trade Cas.) ¶ 74,967 at 96,301 (U.S. March 19, 1974)) the record clearly demonstrates that in fact concentration has been decreasing in the industrial gas market and, when measured by the best available statistics, is nowhere near the level alleged in the complaint.

the constant threat of backward integration by the industry's largest customers, preclude oligopolistic behavior by the companies in the market. See Turner, Conglomerate Mergers and Section 7 of the Clayton Act, 78 Harv. L. Rev. 1313, 1363 (1965); Note, United States v. Falstaff Brewing Corporation: Potential Competition Re-examined, 72 Mich. L. Rev. 837 (1974). Unanimous testimony by witnesses from the industry indicated an extremely high degree of competition.

In short, the structure of the United States industrial gas business is such that no pro-competitive effect could be felt from the presence of BOC outside the market and unanimous testimony indicated that no such effect in fact was exerted. Every single witness who was asked the question testified that he had never made a pricing decision, a marketing decision, a production decision, or a research and development decision predicated in any way upon his perception of BOC as a potential entrant into the market.

Complaint counsel totally failed to produce any "hard evidence" of a wings effect by BOC, (U.S. v. Marine Bancorporation, supra, at 97,037) much less an actual, existing and disciplinary effect on prices. See General Mills, Inc., 80 F.T.C. 985, 3 Trade Reg. Rep. (1974 Trade Cas.) ¶ 20,457 at 20,360 (1973). While no question exists but that BOC could over a period of time and at great expense have entered

the United States industrial gas business in a fashion other than acquiring stock in Airco, the overwhelming evidence (discussed below) indicates that BOC would not have done so, and the companies in the industry never acted in the belief that BOC would enter.

A review of the evidence also shows that complaint counsel have not proved that BOC was an actual potential entrant into the industrial gas market. As Justice Marshall said in Falstaff:

> "Obviously, the anticompetitive effect of such an acquisition depends on the possibility that the firm would have entered de novo had it not entered by acquisition. If the company would have remained outside the market but for the possibility of entry by acquisition, and if it is exerting no influence as a perceived potential entrant, then there will normally be no competitive loss when it enters by acquisition. Indeed, there may even be competitive gains to the extent that it strengthens the market position of the acquired firm. Thus, mere entry by acquisition would not prima facie establish a firm's status as an actual potential entrant." United States v. Falstaff Brewing Corp., 410 U.S. 526, 561 (1973)(Concurring Opinion)

The clear testimony of BOC executives was that BOC would not have entered the U.S. market. Even more important is the fact that extensive documentation exists to support that testimony which documentation was prepared long before this proceeding commenced or the Airco transaction arose.

As the Supreme Court recently said in United States v. Marine Bancorporation:

> "Two essential preconditions must exist before it is possible to resolve whether the Government's theory, if proven, establishes a violation of §7. It must be determined: (i) that in fact NBC has available feasible means for entering the Spokane market other than by acquiring WTB; and (ii) that those means offer a substantial likelihood of ultimately producing deconcentration of that market or other significant procompetitive effects. The parties are in sharp disagreement over the existence of each of these preconditions in this case. There is no dispute that NBC possesses the financial capability and incentive to enter. The controversy turns on what methods of entry are realistically possible and on the likely effect of various methods on the characteristics of the Spokane commercial banking market." Supra, at 97,034.

In short, "ease of entry on the part of the acquiring firm is an essential premise of the potential competition doctrine". Id.at 97,032.

Clear economic testimony indicates that BOC could not on any feasible basis have entered the United States industrial gas market either de novo or by a "foothold" acquisition. In large part, this was due to the very "barriers to entry" emphasized by the staff in its complaint. (Complaint, ¶¶ 23, 27(d))

The testimony showed that the industrial gas business was so capital intensive and competition therein was already so great, that an expenditure of $240 million on a de novo entry might have produced for BOC after ten years

only a small market share, which in itself would only have given BOC a minimal return. In short, the attempt would not have been economically worth the effort.

Furthermore, no evidence exists that any small industrial gas company in the United States constituted anything more than a "peripheral foothold [which] cannot be viewed as an economically feasible method of entry." U.S. v. Marine Bancoroation, supra, at 97,036. The companies trotted out by the staff and cited as potential footholds (even if they were realistically available for purchase, which was not proved) could never have provided BOC with anything other than, at a terribly high price, a minor entry into a regional market which could only be maintained by the kind of family service previously provided by such company. Clear evidence indicated that any attempt to expand such small companies would have given BOC no advantage over a de novo attempt to enter the market. See Missouri Portland Cement v. Cargill, 5 Trade Reg. Rep. (1974 Trade Cas.) ¶ 75,113 at 96,956 (2d Cir. June 10, 1974), petition for cert. filed, 43 U.S.L.W. 3017 (U.S. July 23, 1974) (No. 73-2014).

All this is perfectly in accord with the conclusion BOC itself reached, after an exhaustive study of the U.S. industrial gas market - the Perham-Greenfield report. BOC firmly decided, at its highest level, that it could not, and would not attempt to, enter the market. No material contrary evidence exists and no contrary finding can be made.

In sum complaint counsel has failed to demonstrate either a product or geographic market in which to test their theories of potential competition. Even assuming those markets BOC was neither a perceived potential entrant exert-a pro-competitive effect on the market nor an actual potential entrant.

2. No Lessening of Competition Has Been Shown in the Two Medical Product Markets

The complaint alleges a substantial lessening of actual competition in two medical product markets, inhalation anesthetic equipment and inhalation therapy equipment.* Complaint counsel rely upon supposed actual competition between the Ohio Medical Products Division of Airco and two BOC subsidiaries, Fraser Sweatman and Harris Lake

Ohio Medical sells a great variety of medical products but less than 20% of its approximately $47 million in 1973 sales are alleged to be involved here. On the other hand, Fraser Sweatman and Harris Lake are tiny companies, acquired just recently. Virtually none of the medical products they sell compete with products sold by Ohio.

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* The complaint also alleges a substantial lessening of potential competition in the medical pipeline systems market but this contention was abandoned during pretrial.

The largest part of Harris Lake's sales is comprised of the so-called Wright respirometer. The evidence is unequivocal that Ohio does not sell any kind of respirometer.

Fraser Sweatman's principal sales items are dental analgesia machines, anesthesia vaporizers and veterinary anesthesia machines. Ohio does not make dental analgesia machines. Ohio has just recently begun manufacturing a relatively small number of anesthesia vaporizers, either built into or to be used with its anesthesia machines, but does not make the so-called "tec type" vaporizer made by Fraser Sweatman. Indeed, Ohio purchases such vaporizers from Fraser Sweatman.

Ohio does make and sell anesthesia machines and Harris Lake assembles and sells the BOC-manufactured "Boyle Table" anesthesia machine and Fraser Sweatman sells a few veterinary anesthesia machines. However, the grand total of such sales by the BOC subsidiaries in 1973 was under $500,000.

Thus, there was no substantial actual competition between Ohio, on the one hand, and Fraser Sweatman or Harris Lake, on the other hand. Moreover, complaint counsel have utterly failed to establish any universe of sellers, products or sales within which to judge the small amount of competition they allege did exist.

The only evidence in the record as to the size of the two alleged medical product markets is information from respondents and certain third parties chosen by complaint counsel to be subpoened, and qualified guesses permitted to be given by a few industry members. The record contains sales information about some 26 third party firms in the alleged inhalation anesthetic market and about some 28 third party firms in the alleged inhalation therapy market. There is also evidence that at least 43 additional firms make or import items in the former alleged market and 24 in the latter, about none of which is there any sales information in the record.

The subpoena returns show that the responding firms did not answer in any uniform manner and were to some extent arbitrary in their product classifications (e.g., respirators). It is highly likely that many returns omitted sales of products listed on other returns. This confusion can be seen by the items listed in the catch-all "Other" category. Thus, the returns, and indeed the record herein itself, show no sales figures for many products which witnesses testified would have to be included in any broadly defined market such as alleged by complaint counsel,

including intermittent positive pressure breathing devices ("IPPB" equipment), pulmonary function equipment and the various kinds of monitoring devices used during surgical procedures.* As the Commission has said:

> "The search for a proper line of commerce in which to measure the effects of a merger is too important to be left to speculation." Sterling Drug Inc., supra, at 21,977.

One thing that is clear from the subpoena returns is that few of the firms in either alleged market sell more than a very few of the dozens of products included and there are no really "full line" sellers. Additionally, the record establishes that no large capital investment, sophisticated technology or huge sales force is needed to enter the alleged markets. The resulting ease of entry and large number of companies already in the markets shows that no substantial lessening of competition could have occurred as a result of the acquisition here in question. Id. at 21,979.

In sum, complaint counsel have not proved their alleged medical product markets and in any event have shown no actual competition between Ohio and the BOC subsidiaries in the alleged inhalation therapy market and only the most insignificant amount of competition in the alleged inhalation anesthetic market.

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* Indeed, the evidence shows that inhalation therapy is but one small and really artificial subsection of the respiratory care field.

C. Complaint Counsel Did Not Prove that Airco violated Section 5

Complaint counsel have conceded that if no violation of Section 7 of the Clayton Act by BOC was proved, Airco cannot be found to have violated Section 5. Airco contends that, even if a Section 7 violation is found, nevertheless it cannot be found in violation of Section 5.

Section 5(a)(1) of the Federal Trade Commission Act reads in full:

> "Unfair methods of competition in commerce, and unfair or deceptive acts or practices in commerce are declared unlawful." 15 U.S.C. §45(a)(1)

The basis for the Section 5 claim against Airco is two agreements, dated July 25 and December 10, 1973, entered into between Airco and BOC. The July 25 agreement precluded BOC from acquiring any Airco stock and the December 10 agreement permitted such acquisition under then existing circumstances up to not more than four million shares (approximately 35%) of Airco's stock while giving Airco valuable rights, including a right of first refusal should BOC dispose of such stock.

These agreements were fully disclosed and never hidden so no claim of deception can be made. See CX-125-Z-15, 16. Complaint counsels' contention must, therefore, be that somehow these agreements are "unfair methods of competition" or "unfair... acts or practices". Absolutely no specific delineation of this contention has ever been offered by complaint counsel.

The United States Court of Appeals for the District of Columbia has recently commented as follows with respect to the Commission's ability to promulgate rules defining the scope of Section 5:

> "The Commission is hardly free to write its own law of consumer protection and anti-trust. The statutory standard which the rules may define with greater particularity is a legal standard." National Petroleum Refiners Association v. F.T.C., 482 F.2d 672, 693 (D.C. Cir. 1973), cert. denied, 39 L. Ed. 2d 567) (February 25, 1974).

The Commission itself described the factors which should be considered in determining whether a particular act or practice is "unfair":

> "[T]he factors that determine whether a particular act or practice should be forbidden on this ground are as follows: (1) whether the practice, without necessarily having been previously considered unlawful, offends public policy as it has been established by statutes, the common law, or otherwise -- whether, in other words, it is within at least the penumbra of some common-law, statutory, or other established concept of unfairness; (2) whether it is immoral, unethical, oppressive, or unscrupulous; (3) whether it causes substantial injury to consumers (or competitors or other businessmen). If all three factors are present, the challenged conduct will surely violate Section 5 even if there is no specific precedent for proscribing it. The wide variety of decisions interpreting the elusive concept of unfairness at least makes clear that a method of selling violates Section 5 if it is exploitative or inequitable and if, in addition to being morally objectionable, it is seriously detrimental to consumers or others. Beyond this, it is difficult to generalize.

> "In the last analysis, the Commission's responsibility in this area is to enforce a sense of basic fairness in business conduct. For while Section 5 'does not authorize regulation which has no purpose other than . . . censoring the morals of businessmen' (F.T.C. v. R. F. Keppel & Bro., Inc., 291 U.S. 304, 313 (1934)), the Commission cannot shirk the difficult task of defining and preventing those breaches of the principles of fair dealing that cause substantial and unjustifiable public injury." Statement of Basis and Purpose of Trade Regulation Rule 408, Unfair or Deceptive Advertising and Labeling of Cigarettes in Relation to the Health Hazards of Smoking. 29 Fed. Reg. 8355 (1964). (Emphasis added)

These factors were quoted with approval by the Supreme Court in F.T.C. v. Sperry & Hutchinson Co., 405 U.S. 233, 244-45 n.5 (1972) and have been reaffirmed by the Commission in Pfizer, Inc., 81 F.T.C. 23, 60-61 (1972).

Complaint counsel has not suggested any public policy the agreements offend other than possibly Section 7 of the Clayton Act. In fact, complaint counsels' concession during these proceedings that the case against Airco would become moot should they fail to establish a violation of Section 7 by BOC suggests that the Clayton Act is the only public policy on which complaint counsel might rely.

This narrow analysis of the two agreements fails to consider that without such agreements BOC would have been free to make a cash tender offer for all the stock of Airco. The two agreements limited BOC's rights to make such an offer and provided Airco's shareholders with valuable additional protections.

Without the agreements BOC could have acquired an unlimited amount of the outstanding Airco stock. With the agreements, BOC is limited in its acquisition to a specific amount. If that acquisition violates Section 7, the agreements limited the amount or extent of that violation, a limit which would not otherwise exist.

Airco entered into the July 25th agreement with BOC specifically to endure that BOC would keep confidential the information it received and to ensure that BOC would not be able to use such information tender for Airoc's stock without the prior approval of Airco's Board of Directors. (APF-11) The effect of the July 25th agreement is to prohibit BOC from what it otherwise could have done, namely tender for Airco's shares irrespective of the views of the Airco Board of Directors.

The second agreement with BOC, dated December 10, was entered into in a particular context which has to be examined to understand both the import of the agreement and its consequences to Airco shareholders. Curtiss-Wright had informed Airco of its intention to tender for Airco's common stock. (APF-14) After hearing the presentation by Curtiss-Wright's representative and obtaining the results of a detailed study by Airco's advisers about Curtiss-Wright, Airco's Board of Directors concluded that the proposed tender offer by Curtiss-

Wright was not in the best interest of their shareholders for two very specific reasons. (APF-15, 16) First, the proposed Curtiss-Wright tender offer was at a price considered inadequate, particularly in light of the substantially higher book value of Airco's stock at that time. (APF-16) Second, Airco had also concluded that a closer association between Curtiss-Wright and Airco would be harmful to Airco's business. (APF-15) Airco's Board of Directors consented to a limited BOC tender offer because BOC offered Airco's shareholders $2 more per share than Curtiss-Wright had offered and because Airco's Board believed that BOC was a better prospective partner than Curtiss-Wright. (APF-21)

In the December agreement consenting to BOC's offer, Airco obtained additional rights and assurances from BOC as a condition to its consent (APF-22, 23, 24). It reaffirmed that BOC would not acquire additional shares without the consent of Airco's Board of Directors (APF-22, 24), limited the number of BOC representatives on Airco's Board and gave Airco a direct voice in the management of Airco's largest shareholder. (APF-24) These provisions effectively insured the ability of Airco management and Board of Directors to act in the interest of all the shareholders of Airco and is the very type of protection for the shareholders of a target company that the so-called Williams Act was intended to provide. 15 U.S.C. §78n (d)-(e); Comm. on Banking and Currency. Full Disclosure of Corporate Equity Ownership and In Corporate Takeover Bids, S. Rep. No. 550,

90th Cong., 1st Sess. 1-4 (1967); Aranow & Einhorn, Tender Offers for Corporate Control, 64-69 (1973).

The December 10 agreement also gives Airco a right of first refusal should BOC decide to dispose of its holding in Airco stock. Exercise of this right would effectively reinstate the status quo ante for tendering Airco shareholders because of the pro ration during BOC's tender offer; in other words, each tendering shareholder, although holding fewer shares would own approximately the same proportion of the company as he did before the BOC tender. This right provides the kind of option for Airco to protect its shareholders that Airco's Board sought when it first developed its plan to respond to a tender offer. At the same time the possibility of such a purchase of its own stock by Airco could not in any way conflict with the policy underlying Section 7 of the Clayton Act.*

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* Such rights of first refusal are valid and consistent with public policy:

> "According to the weight of authority, an agreement between a stockholder and the corporation giving the latter an option to purchase his shares before offering them to others is valid as between the parties and as against transferees with notice." 12 Fletcher Cyc. Corp. §5461.6 at 214 (Perm. Ed. 1971) and cases cited therein at note 3; Allen v. Biltmore Tissue Corp., 2 N.Y. 2d 534 , 141 N.E. 2d 812, 161 N.Y.S. 2d 418 (1957).

Similarly the provisions of the December 10 agreement respecting the election of directors are enforceable and not against public policy. Cf. Lockley v. Robie, 276 App. Div. 291, 295, 94 N.Y.S.2d 335, 338 (4th Dept.), modified on other grounds, 301 N.Y. 371, 93 N.E. 2d 895 (1950). By its terms the agreement is governed by New York Law. CX-108B

On December 10th, when Airco consented to the limited BOC tender offer its alternatives were clear. Either Airco could strike the best possible bargain with BOC to protect its shareholders in any subsequent closer association or Curtiss-Wright (whose tender offer had already been outstanding for a week and which Airco had decided would not be an attractive partner) would obtain a very substantial position in Airco's stock without any of the protections Airco's shareholders obtained from BOC and at a price which the Airco Board of Directors considered to be inadequate. (APF-16) Having obtained what they considered to be a better alternative for the shareholders, Airco's directors permitted BOC's offer to be mailed to Airco's shareholders so they would have both alternatives available when they made their decision. (APF-25) The directors left the decision of whether to tender to BOC to the shareholders without any recommendation that they accept the BOC offer. (APF-26)

Complaint counsel's analysis of the public policy implication of the two BOC-Airco agreements, tracking as it does the analysis in Dean Foods, Co. 70 F.T.C. 1146 (1966), ignores both the facts of the Dean Foods case and the nature of the agreements between Airco and BOC.

The first and most obvious distinction with the facts in Dean Foods is that Airco has sold nothing to BOC, nor is there any agreement between Airco and BOC calling for any sale by Airco of assets, stock or anything else to BOC. The second and more fundamental distinction is that in Dean Foods the acquired company made possible the acquisition which violated Section 7 of the Clayton Act. Without the agreement in Dean Foods the acquiring company could not have made the purchase which was found to have violated Section 7.

Here, the agreements have exactly the opposite impact from the agreement in Dean Foods. If there had been no agreement between Airco and BOC, BOC could have acquired even more Airco stock from Airco's public shareholders by tender offer or otherwise. An analysis of the public policy implications of the two agreements between Airco and BOC must inevitably lead to the conclusion that those agreements are consonant with the policies enunciated in the Williams Act and the case law and are not inconsistent with the policy of Section 7 of the Clayton Act. Accordingly the agreements do not offend public policy.

There have been no allegations, much less any proof, that the agreements are unethical, unscrupulous, im-

moral or oppressive such as to be found "unfair" under the second factor considered by the Commission.

As for the Commission's third factor, there are allegations that BOC's acquisition of Airco stock caused injury to consumers and competitors. (Complaint ¶ 27) That paragraph also alleges that by means of the agreements "Airco and BOC undertook to eliminate the potential and actual competition between Airco and BOC." The two agreements were not an undertaking to eliminate competition because without the agreements BOC could have acquired the same or larger amounts of Airco stock. Airco did not agree to eliminate competition, and there is no proof or charge in the record that the agreements caused any injury on any other basis. Finally, complaint counsel made no attempt to prove specific injury to competitors, much less to consumers.

When considered in light of the three factors the Commission has adopted to determine whether an act is "unfair," Airco's conduct does not fall within the prohibitions of Section 5 of the Federal Trade Commission Act. It is against this standard that Airco's conduct must be measured because as Milton Handler has said:

> "[T]he sky is not the limit. The jurisdictional boundaries [of Section 5] must be related to the statutory purpose -- which is not to endow the Commission with unlimited censorious power to regulate

business conduct regardless of whether it is fraudulent, unscrupulous, or contrary to acceptable moral precepts." M. Handler, Twenty-Five Years of Antitrust, 73 Colum. L. Rev. 415, 447 (1973).

In summary, the Commission's allegations that Airco violated Section 5 of the F.T.C. Act have not been supported in the record on two independent grounds. First BOC did not violate Section 7 of the Clayton Act when it acquired Airco stock from the public which by complaint counsel's own admission moots any claim against Airco. Second, irrespective of the allegations against BOC, the two agreements between Airco and BOC come nowhere near meeting the criteria which the Commission has adopted to determine whether an act is "unfair" within the meaning of Section 5.

III. Proposed Conclusions of Law

1. Complaint counsel has failed to prove that industrial gases is a line of commerce within the meaning of Section 7 of the Clayton Act.

2. Complaint counsel has failed to prove that the entire United States is a relevant geographic market for the sale of industrial gases.

3. Complaint counsel has failed to prove that inhalation anesthetic equipment is a line of commerce within

the meaning of Section 7 of the Clayton Act.

4. Complaint counsel has failed to prove that inhalation therapy equipment is a line of commerce within the meaning of Section 7 of the Clayton Act.

5. Complaint counsel has failed to prove that the acquisition by BOC of Airco's common stock from the public substantially lessened potential competition in the sale of industrial gases in the United States.

6. Complaint counsel has failed to prove that the acquisition by BOC of Airco's common stock from the public substantially lessened competition in the sale of inhalation anesthetic equipment.

7. Complaint counsel has failed to prove that BOC's acquisition of Airco's common stock from the public substantially lessened competition in the sale of inhalation therapy equipment in the United States.

8. The failure to establish that BOC violated Section 7 of the Clayton Act moots the claim that Airco violated Section 5 of the Federal Trade Commission Act by reason of the agreements between Airco and BOC.

9. Complaint counsel failed to prove that the July 25 and December 10, 1973 agreements between Airco and

BOC constituted unfair methods of competition or unfair acts or practices in violation of Section 5 of the Federal Trade Commission Act.

10. Complaint counsel has failed to prove the necessity for ordering BOC to divest itself of its holding in the common stock of Airco.

11. Complaint counsel has failed to prove the necessity for depriving Airco of its rights under the July 25 and December 10, 1973 agreements.

12. The complaint should be dismissed in its entirety as to both BOC and Airco.

Dated: New York, New York
August 2, 1974

Respectfully submitted,

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CERTIFICATE OF SERVICE

This is to certify that I have caused this day to be mailed, by first class mail, two copies of the annexed "Proposed Findings of Fact, Conclusions of Law and Brief" to Paul, Weiss, Rifkind, Wharton and Garrison, 345 Park Avenue, New York, New York 10022 attorneys for Respondents The British Oxygen Company Ltd., BOC Financial Corporation, BOC Holdings, Ltd., British Oxygen Investments, Ltd.

Danforth Newcomb

Dated: New York, New York
August 2, 1974

A 723

FILED: October 18, 1974

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

DOCKET NO. 8955

IN THE MATTER OF

BRITISH OXYGEN COMPANY, LIMITED,

BOC FINANCIAL CORPORATION,

BOC HOLDINGS, LIMITED,

BRITISH OXYGEN INVESTMENTS, LIMITED, and

AIRCO, INCORPORATED,
corporations.

INITIAL DECISION

Ernest G. Barnes,
Administrative Law Judge.

October 18, 1974

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

In the Matter of

BRITISH OXYGEN COMPANY, LIMITED,*
[illegible] FINANCIAL CORPORATION,
[illegible] HOLDINGS, LIMITED,*
BRITISH OXYGEN INVESTMENTS, LIMITED,* and
AIRCO, INCORPORATED,
corporations.

DOCKET NO. 8955

INITIAL DECISION

By Ernest G. Barnes, Administrative Law Judge.

K Keith Thurman, Esquire,
Gordon Youngwood, Esquire,
Donald E. Purcell, Esquire,
Daryl A. Nickel, Esquire,
Rhett R. Krulla, Esquire,
John R. Hoagland, Esquire,
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New York, New York,
Attorneys for Airco,
Incorporated.

* The correct names of the companies are The British Oxygen Company Limited, BOC Holdings Limited, and British Oxygen Investments Limited.

PRELIMINARY STATEMENT

Respondents The British Oxygen Company Limited (hereinafter "BOC"), BOC Financial Corporation, BOC Holdings Limited. and British Oxygen Investments Limited (hereinafter collectively "BOC" or "BOC respondents") are charged with violation of Section 7 of the Clayton Act, as amended (15 U.S.C. § 18); and BOC respondents and respondent Airco, Incorporated (hereinafter "Airco") are further charged with violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. § 45) through the acquisition by BOC Financial Corporation of four million shares (35%) of the stock of Airco for $80 million by means of a public tender offer. The Federal Trade Commission issued its complaint on February 26, 1974, approximately two months after the said acquisition occurred.

The complaint alleges that the effect of the acquisition of Airco stock by BOC respondents may be substantially to lessen competition or to tend to create a monopoly in the manufacture, distribution or sale of industrial gases, inhalation anesthetic equipment, inhalation therapy equipment, and medical gas pipeline systems or any submarkets of the above markets throughout the United States, or sections thereof in violation of Section 7 of the Clayton Act, as amended (15 U.S.C. §18); and the effect of the agreements by which Airco and BOC respondents undertook to eliminate the potential and actual competition between BOC and Airco may be to unreasonably restrain trade, and to hinder or have a dangerous tendency to hinder competition unduly, thereby constituting an unfair act or practice in commerce, in violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. § 45). These effects may occur, the complaint alleges, in the following among other ways:

"(a) Substantial potential competition through internal expansion or toehold acquisition, and substantial actual competition between BOC and Airco may be eliminated:

"(b) The restraining influence of BOC as an actual or potential competitor may be eliminated;

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"(c) The competitive benefits of internal expansion and innovation by BOC may be eliminated;

"(d) Already high barriers to entry of new competition may be heightened and increased;

"(e) Members of the purchasing public and the ultimate consumer may be denied the benefits of free and open competition;

"(f) BOC, a leading international competitor in electrical welding equipment, and gas welding and cutting equipment may be eliminated as a potential entrant into the concentrated United States electrical welding and gas welding and cutting markets by virtue of the acquisition of a large industrial gas company with presently existing substantial lines of electrical welding and gas welding and cutting equipment;

"(g) Substantial competition between BOC and other companies for sale of products to Airco may be eliminated;

"(h) Airco, a leading competitor may become further enhanced;

"(i) Competitors or Airco may become competitively disadvantaged; and

"(j) The effect of the stock acquisition may be to entrench or increase already high levels of concentration by encouraging tendencies for combination and merger by actual and potential competitors."

On the day this proceeding was commenced, the Federal Trade Commission applied to the United States District Court for the District of Delaware for a temporary restraining order and a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, votings its Airco stock, having BOC personnel serve on the Airco board of directors, increasing or decreasing its holdings of Airco stock, and exchanging trade secrets and similar material with Airco pending the disposition of the administrative complaint.

On February 28, 1974, the Court issued a temporary restraining order and thereafter, on March 8, 1974, a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, exchanging trade secrets with Airco on the condition that the Commission expedite the administrative proceeding and file a report at least every ninety (90) days with respect to the status of the matter. The District Court did allow, however, BOC to vote its Airco shares and four representatives from BOC to be seated on Airco's board of directors. Federal Trade Commission v. British Oxygen Co., 1974 CCH Trade Cas. ¶ 75,003 (D. Del. 1974).

Answers were filed by Airco on March 12, 1974, and by BOC respondents on March 14, 1974, admitting in part and denying in part the various allegations of the complaint. On May 24, 1974, BOC respondents filed an amended answer, admitting in part and denying in part the various allegations of the complaint.

On March 12, 1974, BOC respondents moved for a fixed and expedited schedule for the administrative proceeding, which motion was certifed to the Commission by the Administrative Law Judge. By order of April 2, 1974, the Commission denied the motion insofar as it sought a fixed schedule, but ordered that the proceeding be expedited (Order Denying Motion For Fixed Schedule, April 2, 1974).

Prehearing conferences were held in Washington, D.C., on March 12, March 28, April 17, and April 25, 1974. At the prehearing conference held on April 25, 1974, complaint counsel informed the Administrative Law Judge and respondents that they would not offer any proof with respect to the violations alleged in the complaint relating to medical pipeline systems and electrical and gas welding and cutting equipment (PHC. Tr. 134-35).

Discovery motions were subsequently filed by complaint counsel and BOC respondents. Proposed exhibit lists, copies of proposed exhibits, and witness lists were exchanged by the parties before the hearings began. Complaint counsel, on March 15, 1974, filed a statement of issues.

BOC respondents, on March 19, 1974, moved for the issuance of a subpoena directed to the Commission calling for the production of certain documents obtained by the

Commission staff during the course of an investigation of the industrial gases industry in the United States, for use in the preparation and defense of this matter. On April 23, 1974, the Administrative Law Judge granted this motion in part. Complaint counsel and several third parties sought interlocutory review of this order by the Commission. Following the conclusion of substantially all of complaint counsel's case-in-chief, the Commission granted the applications for review and upheld the Administrative Law Judge's determination (Order Granting Applications For Review, May 29, 1974). Production of the documents ordered to be made available to respondents began on June 10, 1974, and was completed on June 18, 1974.

Presentation of the case-in-chief began in Washington, D.C., on May 6, 1974, and concluded on May 23, 1974, subject to the right of complaint counsel to offer certain documents into evidence. Presentation of BOC respondents' defense began in New York, New York, on June 5, 1974, and concluded in Washington, D.C., on June 18, 1974. Airco presented its defense in Washington, D.C., on June 18, 1974. Rebuttal was presented by complaint counsel in Washington, D.C., on June 27, 1974. The hearings were terminated on June 27, 1974, subject to the right of complaint counsel to offer into evidence certain documents subpoenaed from Stanford Research Institute.

At the hearing on June 27, 1974, the Administrative Law Judge set July 26, 1974 for filing of proposed findings by the parties, and August 5, 1974 for the filing of replies thereto. Pursuant to respondents' request, the Administrative Law Judge issued an order on July 25, 1974, extending the time for filing proposed findings to and including August 2, 1974, and for replies thereto to and including August 12, 1974. Following the receipt of further documents in evidence, on August 2, 1974, the Administrative Law Judge closed the record for the reception of evidence. Proposed findings and confidential proposed findings were filed by complaint counsel on August 2, 1974; proposed findings and proposed findings containing in camera material were filed by BOC respondents on August 7, 1974. On August 8, 1974, the Administrative Law Judge extended the time for filing reply briefs to and including August 22, 1974. On August 22, 1974, complaint counsel filed a reply brief and confidential reply brief. On August 22, 1974, BOC respondents filed their reply brief and a reply brief containing in camera material. Airco's proposed findings and brief were filed on August 5, 1974.

Complaint counsel called a total of twenty (20) witnesses, and respondents eight (8) witnesses. Over five hundred (500) exhibits were received in evidence during the trial.

This proceeding is before the undersigned upon the complaint, answers, testimony and other evidence, proposed findings of fact and conclusions and briefs filed by complaint counsel and by counsel for respondents. These submissions by the parties have been given careful consideration and, to the extent not adopted by this decision in the form proposed or in substance, are rejected as not supported by the record or as immaterial. Any motions not heretofore or herein specifically ruled upon, either directly or by the necessary effect of the conclusions in this decision, are hereby denied. The findings of fact made herein are based on a review of the entire record and upon a consideration of the demeanor of the witnesses who gave testimony in this proceeding.

For the convenience of the Commission and the parties, the findings of fact made hereinafter include references to the principal supporting evidentiary items in the record. Such references are intended to serve as convenient guides to the testimony and exhibits supporting the findings of fact, but do not necessarily represent complete summaries of the evidence considered in arriving at such findings.

References to the record are set forth in parentheses, and certain abbreviations, as hereinafter set forth, are used:

CCPF - Proposed Findings of Fact, Conclusions of Law and Order submitted by Complaint Counsel, followed by the Proposed Finding being referenced.

BOC PF - Proposed Findings of Fact, Conclusions of Law and Order (In Camera Material Deleted) submitted by BOC Respondents, followed by Proposed Finding being referenced.

BOC PF' - Proposed Findings of Fact, Conclusions of law and Order (In Camera Material Deleted) submitted by BOC Respondents, followed by Proposed Finding page or pages being referenced.

CCRB - Reply Brief submitted by Complaint Counsel, followed by page or pages being referenced.

BOC RB - Reply Brief submitted by BOC Respondents, followed by page or pages being referenced.

CX - Commission's Exhibit, followed by number of exhibit being referenced.

BOC RX - BOC Respondents' Exhibit, followed by number of exhibit being referenced.

RAX - Respondent Airco's Exhibit, followed by number of exhibit being referenced.

PHC Tr. - Official transcript of the prehearing conferences, followed by the page number being referenced. Reference to the official transcript of the formal hearings is by the page number being referenced preceded by the name of the witness whose testimony is being referenced.

FINDINGS OF FACT

I. IDENTITY AND BUSINESS OF RESPONDENTS

A. BOC Respondents

1. Respondent The British Oxygen Company Limited ("BOC") is now, and was at the time of the acquisition, a publicly-held United Kingdom company with its principal executive offices at Hammersmith House, London W6, England (Complaint and BOC Answer, Par. 2; Smith 1639, 1642, 1698-99).

2. BOC is engaged in the manufacture and sale of industrial gases, including rare gases and medical gases; welding equipment; special metals; air separation equipment; medical equipment, including inhalation anesthetic equipment; inhalation therapy equipment and medical pipeline equipment; aircraft breathing equipment; vacuum equipment and instrumentation; and food products. In the fiscal year ending September 30, 1972, BOC sales totalled 252.6 millions pounds sterling, or $606.2 million at an exchange rate of $2.40 to the pound 1/ (Complaint and BOC Answer, Par. 3). In fiscal year ended September 30, 1973, BOC had sales of approximately $766 million (CX 292C).

3. In 1972 and 1973, BOC was the leading manufacturer of industrial gases in the United Kingdom (BOC Admissions, Pars. 32, 33, filed April 12, 1974), and produced and marketed industrial gases in a number of countries throughout the world including Ireland, Australia, New Zealand, South Africa, India, Pakistan, Singapore, Malaya, Hong Kong, Canada, East Africa, Rhodesia, Zambia, Indonesia, Thailand, Fiji, New Guinea, the Philippines, Bangladesh, and Italy. BOC has also recently entered the industrial gases market in Brazil (Complaint and BOC Answer, Par. 10; Smith 1644-45, 1790, 1801-1806).

4. In the United Kingdom, BOC manufactures and distributes both inhalation anesthetic equipment and inhalation therapy equipment (Complaint and BOC Answer, Pars. 6, 8).

5. BOC and Airco engaged in a joint venture from 1967 to 1971 for the manufacture and sale of air separation plants in the United States (BOC and Airco Admissions, Pars. 87, 88, filed April 10, 1974 and April 12, 1974; Smith 1716-19, 1810; Giordano 1948-50; Laister 2535).

6. Respondent BOC Financial Corporation is a corporation organized and existing under the laws of the State of Delaware, with a business address of 306 South State Street, Dover, Delaware. All BOC Financial Corporation's common stock is owned by BOC Holdings Limited. BOC Financial Corporation was organized by BOC solely for the purpose of acquiring Airco common stock shares through a tender offer.

1/ Pounds sterling have been converted into dollars at the rate of $2.40 per pound throughout this Initial Decision.

It presently owns the Airco stock, which acquisition is challenged in this proceeding (Complaint and BOC Answer, Par. 12; CX 125 B-D).

7. Respondent BOC Holdings Limited is a United Kingdom company with a business address of Hammersmith House, London W6, England. BOC Holdings Limited is engaged in holding various securities of subsidiaries (direct or indirect) of BOC. All outstanding ordinary shares of BOC Holdings Limited are held by British Oxygen Investments Limited (Complaint and BOC Answer, Par. 13; CX 125 B-D).

8. Respondent British Oxygen Investments Limited is a United Kingdom company with a business address of Hammersmith House, London W6, England. British Oxygen Investments Limited is engaged in holding various securities of subsidiaries (direct or indirect) of BOC. British Oxygen Investments Limited is a wholly owned subsidiary of BOC (Complaint and BOC Answer, Par. 14; CX 125 B-D).

9. In 1973, BOC Holdings Limited acquired all of the capital stock of Harris-Lake, Inc. (BOC Admission, Par. 61, filed April 12, 1974). In 1972, Harris-Lake, Inc. had net sales of $1,511,901, and sold in the United States, products it purchased from BOC (BOC Admissions, Pars. 54, 84, filed April 12, 1974). At the time of the acquisition of Airco stock by BOC, Harris-Lake, Inc. manufactured and sold inhalation anesthetic equipment in the United States (Complaint and BOC Answer, Par. 7; BOC Admission, Par. 27, filed April 12, 1974), and marketed inhalation therapy equipment in the United States (Complaint and BOC Answer, Par. 8; BOC Admission, Par. 28, filed April 12, 1974).

10. Prior to the acquisition of Airco stock by BOC, BOC acquired Cyprane, Ltd., a United Kingdom corporation of which Fraser Sweatman, Inc., a United States corporation, was a subsidiary, and the related Canadian company, Fraser Sweatman, Ltd. (Complaint and BOC Answer, Par. 7; BOC Admission, Par. 34, filed April 12, 1974; CX 11L). Fraser Sweatman, Inc. manufactured inhalation anesthetic equipment in 1972, and had sales of such equipment in the United States for the fiscal years ending in 1972 and 1973 of $2,145,484 and $2,498,146, respectively (BOC Admissions, Pars. 51, 58, 59, filed April 12, 1974). Sales of inhalation anesthetic

equipment by Cyprane, Inc. in the United States for the fiscal year ending in 1972 were $258,499 (BOC Admission, Par. 60, filed April 12, 1974).

11. In or about October 1973, BOC established Medishield, Inc., a Delaware corporation, which presently owns, and owned at the time of the Airco acquisition, all of the common stock of Harris-Lake, Inc. and Fraser Sweatman, Inc., which are domestic corporations, and Fraser Sweatman (Canada) Limited, a Canadian corporation (Complaint and BOC Answer, Par. 5).

12. BOC respondents are engaged, and at the time of the acquisition were engaged, in commerce within the meaning of the Clayton Act and the Federal Trade Commission Act (Complaint and BOC Answer, Par. 11). BOC respondents have additionally consented to the jurisdiction of the Federal Trade Commission (Topkis 126-27).

B. Respondent Airco

13. Respondent Airco, Inc. (Airco) is a publicly-held corporation, organized and existing under the laws of the State of New York, with its principal place of business in Montvale, New Jersey (Complaint and Airco Answer, Par. 16).

14. Airco is engaged in the manufacture of industrial gases, including medical gases; ferroalloys and carbide; cryogenic equipment; welding and cutting equipment; carbon-graphite products; electronics; metals; high-vacuum equipment; calcium carbide; and medical equipment, including inhalation therapy equipment, inhalation anesthetic equipment, and medical pipeline equipment (Complaint and Airco Answer, Par. 17; Giordano 1897-1906; Dillon 2583-84; PAX 7). In 1973, Airco had net sales of $583,811,000 and net income from continuing operations of $19,111,000 (PAX 7, p. 45). As of April 1, 1973, Airco had 96 physical plant locations and 134 sales offices and warehouses (Airco Admissions, Pars. 1-2, filed April 19, 1974).

15. Airco operations in the industrial gases market are conducted through three divisions: Airco Industrial Gases Division, Airco Welding Products Division, and Ohio Medical Products Division (Complaint and Airco Answer,

Par. 17). Airco operations involving inhalation anesthetic equipment and inhalation therapy equipment are conducted through its Ohio Medical Products Division (Complaint and Airco Answer, Par. 18).

16. At the time of the acquisition of Airco stock by BOC, Airco Industrial Gases Division operated plants at Albion, Michigan; Chester, West Virginia; Bethlehem, Pennsylvania; Buffalo, New York; Butler, Pennsylvania; City of Industry, California; Claymont, Delaware; East Alton, Illinois; Fairfield, Alabama; Johnstown, Pennsylvania; New Orleans, Louisiana; Phoenix, Arizona; South Acton, Massachusetts; Vancouver, Washington; Warren, Ohio; Hopewell, Virginia; Lawrence, Kansas; Pedricktown, New Jersey; Riverton, New Jersey; Decatur, Alabama; and Richmond, California, and also operated a gaseous hydrogen plant in the United States (Airco Admissions, Pars. 8, 9, filed April 10, 1974).

17. At the time of the acquisition of Airco stock by BOC, Airco produced acetylene, argon, nitrogen, oxygen, nitrous oxide, medical gases, rare gases, carbon dioxide, hydrogen, and mixtures and combinations of gases (Airco Admission, Par. 7, filed April 10, 1974).

18. At the time of the acquisition of Airco stock by BOC, Airco's subsidiary, Airco Cryoplants Corp., was engaged in the design and construction of air separation plants (Airco Admission, Par. 10, filed April 10, 1974).

19. At the time of the acquisition of Airco stock by BOC, the Ohio Medical Products Division of Airco was engaged in the manufacture and sale of inhalation anesthetic equipment and inhalation therapy equipment in the United States (Complaint and Airco Answer, Pars. 17-19; Airco Admission, Par. 37, filed April 10, 1974). Airco sales of inhalation anesthetic equipment in the United States exceed those of any other company (Complaint and Airco Answer, Par. 19). On April 1, 1973, the Ohio Medical Products Division of Airco operated plants at Berkely, California; Cleveland, Ohio; Fort Myers, Florida; Houston, Texas; Madison, Wisconsin; and Richmond, California (Airco Admission, Par. 5, filed April 10, 1974).

20. At all times relevant herein, Airco sold and shipped its products in interstate commerce and engaged in "commerce" within the meaning of the Clayton Act and

the Federal Trade Commission Act (Complaint and Airco Answer, Par. 21).

II. THE ACQUISITION

21. Airco's stock is traded on the New York Stock Exchange and, as of June 1973, was widely held. Airco had approximately 43,000 stockholders with 11.4 million shares outstanding in June 1973, with its largest shareholder holding approximately 345,000 shares, or approximately 3 percent of the outstanding common stock (Dillon 2585-86).

22. Over the years prior to 1973, BOC and Airco had had a number of commercial contacts, including the joint venture during 1967-1971 for the manufacture and sale of air separation plants in the United States. As a result of these contacts, various members of the senior managements of BOC and Airco became acquainted with one another (Finding of Fact No. 5; Dillon 2585; Giordano 1933; Laister 2537; Smith 1721).

23. One of BOC's managing directors, Peter Laister, learned in June 1973 of rumors relating to an impending tender offer for Airco stock from a group of investment bankers who made a call on Mr. Laister (Laister 2541). Shortly thereafter, Mr. Laister discussed Airco's vulnerability to such a bid with a vice president of Airco during a social occasion (Smith 1721; Laister 2542-43). Mr. Laister also informed Mr. Leslie Smith, BOC's chairman, of the rumors concerning Airco. BOC immediately implemented a study of the possibility of BOC's acquiring Airco (Laister 2542, 2544-46; in camera exhibits: CX 72A-N, 73A-J, 74A-B, 75A-K, 76A-U, 77A-B, 78A-D).

24. The Airco vice president reported to Airco officials the conversation he had had with Mr. Laister of BOC wherein it was suggested by Mr. Laister that BOC and Airco have some closer association. Airco determined to "sort out what the real interest was" (Giordano 2033). Thereafter, on June 30, 1973, Richard Giordano, president of Airco, met with Mr. Smith, chairman of BOC, in London and proposed an amalgamation between BOC and Airco (Giordano 1995-97). At that time, Mr. Giordano was not aware that BOC was already considering making a bid for Airco (Giordano 1997).

25. As a result of the June 30, 1973 meeting, Mr. Giordano and Mr. Smith agreed to form a working party of senior executives of both companies to study the possibility of an amalgamation between BOC and Airco (Smith 1723-24; Giordano 1972; Laister 2546-47; CX 78-A, in camera). The parties also agreed for an exchange of confidential information between the two companies regarding their respective businesses, such as sales, profits and capital investments (Giordano 1972-73; Laister 2546-47; CX 88A-C, CX 301A-Q, in camera; RAX 83). Subsequently, on July 25, 1973, BOC and Airco entered into a written agreement which provided for an exchange of confidential information. The agreement also provided that neither company would make any offer for a period of 5 years to acquire any securities of the other without the prior approval of the other company's board of directors. It was also agreed that the information exchanged would not be disclosed to third parties (CX 99A-D; Giordano 1972-73).

26. Confidential information was exchanged by BOC and Airco representatives at a meeting in New York on July 26 and 27, 1973 (BOC and Airco Admissions, Par. 64, filed April 10, 1974 and April 12, 1974; Smith 1723-24; Giordano 1973-77; Laister 2546-47; in camera exhibits: CX 93A-I; CX 96A-J; CX 301A-Q; RAX 83A-U). After the meeting, BOC and Airco continued to explore the possibility of an amalgamation between the two companies and held subsequent discussions in September and October (Laister 2549-50; in camera exhibits: CX 95A-E; CX 97A-D; CX 98A-C).

27. On November 2, 1973, the Chairman of Curtiss-Wright Corporation informed Airco's senior officers that his company was prepared to make a tender offer for 2 million Airco shares at a price 25 percent over the then market price, or approximately $16-$17 per share (Dillon 2588, 2611). Airco's executives responded that the Airco Board of Directors would have to consider the Curtiss-Wright proposal and consult their advisers before making a substantive response to the Curtiss-Wright statement (Dillon 2589). Airco also immediately contacted BOC about the Curtiss-Wright proposal and sent Mr. Giordano to London to confer with BOC officials (Dillon 2592).

28. Airco commenced a brief study of Curtiss-Wright (Dillon 2589-90), and invited Curtiss-Wright to make a presentation to the Airco Board of Directors about the proposed tender offer. At the time of the Board meeting,

it had been concluded that the Curtiss-Wright proposal would be opposed (Dillon 2592-94). Airco had also concluded that a successful Curtiss-Wright offer would effectively preclude any closer association with any other company, including BOC (Dillon 2599). Airco's Chairman informed Curtiss-Wright's Chairman of the decision by the Airco Board and the latter responded that Curtiss-Wright would not make the offer under those circumstances (Dillon 2595; Laister 2551). Airco and BOC thereafter returned to a study of a closer association between the two companies (Smith 1725; Dillon 2595-96). Working parties were set up to examine the various forms of closer association (Dillon 2595-96), and it was anticipated that additional meetings would take place after the first of the year, 1974 (Dillon 2596).

29. On December 3, 1973, Curtiss-Wright made a public tender offer for 2.4 million shares of Airco's common stock at $18 per share (Dillon 2594-98, 2601; CX 125Z-14). Airco notified BOC of the Curtiss-Wright offer (Laister 2551; Dillon 2597). Airco opposed the Curtiss-Wright tender offer (Dillon 2596-97) and recommended that Airco's shareholders not accept it (Dillon 2606; Giordano 2013-14). On December 4, 1973, Airco sent a letter to its shareholders urging them to reject the Curtiss-Wright offer and asking them to wait to consider possible alternatives to that offer (CX 125Z-9).

30. BOC and Airco entered into a memorandum agreement dated December 10, 1973, in which Airco consented to BOC making an offer for up to 4 million Airco shares. The agreement further provided for reciprocal representation by BOC and Airco on each other's boards of directors. Additionally, the agreement provided that Airco would have first right to purchase or to designate a purchaser for any Airco shares purchased by BOC should BOC subsequently decide to sell (CX 108A-C; Dillon 2599-2601). Also, on December 10, 1973, BOC announced a tender offer through its subsidiary, BOC Financial Corporation, to purchase up to 4 million common shares of Airco at a price of $20 a share (CX 125A-Z-31). Airco consented to BOC's offer, provided BOC access to Airco's shareholder list, and had its transfer agent at BOC's expense mail BOC's offer to Airco's shareholders (Giordano 2014-15; Dillon 2601-02). Further, Airco's Board of Directors sent letters to Airco's shareholders informing them that Airco's Board had consented to BOC's offer and that a

closer association of Airco and BOC would be beneficial to both companies (CX 125Z-9).

31. At the expiration of BOC's tender offer on December 21, 1973, over 6 million shares had been tendered, of which BOC Financial Corporation subsequently purchased 4 million on a pro-rata basis (CX 125Z-10, CX 293C; Complaint and BOC and Airco Answers, Par. 22; RAX 7, p. 2). The cost to BOC of purchasing 4 million shares of Airco was $80 million plus estimated expenses of $2.8 million (CX 293C). The 4 million Airco shares represented approximately 35.3 percent of Airco's outstanding common stock and gave BOC effective working control over Airco (CX 170B). Subsequently, Airco's Board of Directors was enlarged from 12 to 16 directors to provide for four representatives of BOC. In return, BOC invited Airco's Chairman and its President to join BOC's Board of Directors (CX 293E; CX 171C-D; Giordano 2015-17; RAX 7, pp. 2-3). On February 26, 1974, the Federal Trade Commission issued its complaint challenging this acquisition (Complaint).

III. INDUSTRIAL GASES

A. Relevant Product Market

32. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition or tend to create a monopoly in the manufacture, distribution or sale of industrial gases, or any submarkets thereof throughout the United States, or any section thereof (Complaint, Par. 27). "Industrial gases" are defined in the complaint as "gases in compressed, liquid and solid form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof." (Complaint, Par. 1(a)). "Rare gases" include xenon and krypton (Giordano 1910-11; Baker 364). "Medical gases" include nitrous oxide, cyclopropane and oxygen (Kimerling 854-56; Giordano 1900; Loveman 603-10).

33. The term "fuel gases", used by witnesses in this proceeding, refers to gases which are burned in order to provide heat (Kridl 2137, 2143; Flamm 286; Cunningham 934). "Fuel gases" include both gases that are specifically mentioned in the definition of industrial gases contained

in the complaint and gases that are not. Among the fuel gases are acetylene (Flamm 286; Loveman 611-12; Smith 1997-98; Giordano 2003), propane (Flamm 286; Cunningham 934), propylene (Flamm 286; Giordano 1912-13; Perkins 780-81, 798), MAPP (Flamm 286; Cunningham 935; Giordano 2004; Loveman 497-99; Perkins 798), Oxy-MAPP (Giordano 1997), Apache (Heckel 740-41; Cunningham 935), acetogen (Heckel 740-41), and thermogen (ibid.).

34. "Atmospheric gases", a term used throughout this proceeding, are gases generated commercially by the liquification and fractional distillation of air: oxygen, nitrogen and argon, and the rare gases -- xenon and krypton (Baker 364). Atmospheric gases are produced in air separation plants and constitute the most substantial segment of the industrial gases market; for example, such gases account for 75 - 80 percent of the dollar sales by Union Carbide (Linde) and Air Products, 70 percent of dollar sales by Liquid Air, Inc., 65 percent of value of shipments by Chemetron, and 50 percent of the value of shipments by Airco (Flamm 240; Baker 368-70; Dempster 915-16; Cunningham 923; Giordano 1981-82). The above companies are generally acknowledged to be among the largest firms in the industrial gases industry.

35. Complaint counsel have conceded that the various industrial gases are "not substitutable in most cases" (Thurman 278). Rather, each gas is almost invariably used for its unique chemical properties which make them highly desirable for specific purposes. Other products are not readily substitutable for industrial gases (Flamm 276, 279-85; 349-50; Baker 370-72; Kridl 2142). The principal use of oxygen is in the manufacture of steel (Flamm 279-80). Oxygen is used also in the manufacture of glass (Flamm 281), chemicals (CX 232W-Z; Baker 440; Kridl 2164), aluminum (Giordano 1909-10), in welding and cutting (ibid.), and for medical purposes (Flamm 276). The principal characteristics of nitrogen are its chemical inertness and its refrigeration capabilities (Flamm 274). A major use of nitrogen is in the manufacture of ammonia (Kridl 2162-63). Nitrogen is also used extensively for blanketing in order to exclude oxygen and thereby prevent explosions (Giordano 1910). Its principal purchasers are oil companies, chemical companies and electronics companies (Giordano 1910). Nitrogen is used also as a refrigerant for food freezing and in-transit preservation of food (Flamm 283). Argon is an inert chemical element; its principal

use is in stainless steel welding (Giordano 1910; Kridl 2167). Xenon is an inert chemical element used in electronic applications and sold in very small quantities (Giordano 1910-11). Krypton is an inert chemical element sold in very small quantities (Ibid.). Helium is an inert chemical element. It is used in gas shielding processes to exclude the atmosphere, in leak detection, in research, and in balloons (Giordano 1911). Hydrogen is a combustible gas used in a variety of applications including annealing of steel, hydrogenation of foods, as a rocket propellant and in the manufacture of ammonia (Giordano 1911; Kridl 2133). Carbon dioxide is used primarily in the beverage industry for the carbonation of soft drinks. It is used also as a refrigerant in the food industry and as a shielding gas in certain welding applications (Giordano 1911-12). Carbon dioxide and nitrogen are not normally interchangeable in food freezing and refrigeration applications (Flamm 281-83). Acetylene is of unique utility in welding and cutting (Kridl 2168). Nitrous oxide is used by the medical and dental professions as an analgesic or anesthetic (Giordano 1900). Cyclopropane is a human anesthetic (Giordano 1900). MAPP is used primarily for cutting metal. The equipment used for that purpose differs from acetylene cutting equipment (Giordano 1912). Propylene is a fuel gas similar to MAPP. The cutting equipment used with propylene is the same or similar to equipment used with MAPP (Giordano 1913). Propane has two principal uses: heating, including cutting, and the synthesis of propylene (Giordano 1912-13; Kridl 2137). The principal use of butane is in the chemical industry (Kridl 2138). Apache, acetogen and thermogen are fuel gases used for their heating properties (Heckel 240-41).

36. The Bureau of the Census classifies the production and marketing of industrial gases as a separate and distinct line of commerce under Standard Industrial Classification (SIC) 2813 (CX 296A-F, CX 312A-K). The industrial gases industry has been classified by Census as a separate economic entity since at least 1945 (CX 340A-B, CX 341A-B). The United States industrial gases industry has been defined by Census from at least 1945 through the present as those establishments primarily engaged in manufacturing gases for sale in compressed, liquid and solid forms (CX 340A-B, CX 340A-B, CX 339A-B; CX 339A-B, CX 29[illegible]A). The gases classified by Census as industrial gases are acetylene, carbon dioxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other elemental gases, and compressed and

liquified gases (CX 299D, CX 300A-D, CX 312C-D). The same group of gases have been classified as industrial gases by Census since at least 1954 (CX 337A-C).

37. Firms engaged in the production and marketing of industrial gases recognize the industrial gases industry as a separate and distinct line of business (Flamm 210-11, 213-14; Baker 363-64; Dempster 513; Loveman 577; Muller 648, 650; Heckel 730; Perkins 780; Kimerling 854; Cunningham 917). Industry executives who testified in this proceeding identified as their competitors companies who produce and distribute industrial gases and each invariably named the same companies as being engaged in this line of business (Flamm 223-24; Baker 364-65; Dempster 516-17; Loveman 578-79; Heckel 732-33; Kimerling 857; Cunningham 918).

38. The industrial gases industry is represented by two trade associations, the Compressed Gas Association (CGA) and the International Oxygen Manufacturers Association (IOMA) (Flamm 230-31; Baker 394-95; Loveman 581; Hines 757-58; 764; Perkins 789; Kimerling 858-59; Cunningham 924). The purpose of the associations is to provide for exchange of information and ideas and keep their members abreast of developments in the industrial gases industry (Flamm 230-31; Baker 395; Hines 758; Kimerling 860). Only producers of industrial gases qualify for membership in IOMA (Hines 758, 763-64).

39. There is common industry recognition that the atmospheric gases--oxygen, nitrogen, argon, xenon and krypton--are industrial gases and are marketed by industry members. Industry witnesses who testified in this proceeding also identified hydrogen, helium, carbon dioxide and acetylene as industrial gases and as being marketed by their companies (Flamm 213, 270; Baker 364, 427; Dempster 514-15; Loveman 577; Muller 648; Heckel 730; Perkins 780; Kimerling 854; Cunningham 917). There is no unanimity of view as to gases such as carbon monoxide, nitrous oxide, and the various fuel gases other than acetylene, which is clearly recognized by the industry as an industrial gas (Flamm 215, 218, 270, 275; Baker 372, [illegible]-27; Dempster 514, 555; Loveman 597-98; Perkins 730, [illegible]; Kimerling 854). Fuel gases such as propane, butane, and propylene are not classified by the Bureau of the Census as industrial gases and are specifically excluded from SIC 2813 (CX 312A, CX 312 a. 10). These fuel gases are hydrocarbon products and are part of the petroleum

industry (Baker 426; Perkins 798; Cunningham 933-34). The small amount of these gases sold by members of the industrial gases industry are used in metal cutting, which is one of the uses of acetylene. Such gases are not, however, used for welding, which is a major use of acetylene (Giordano 1912; Kridl 2138-39). These latter gases and mixtures thereof, are specialty gases, and are sold by some companies and not others. However, such gases constitute a very small and insignificant percentage of total industry sales (Flamm 214, 218, 270, 275; Dempster 514-15, 569; Loveman 612; Heckel 750; Kimerling 854-55; Cunningham 934; Smith 1891; Giordano 1984).

40. Industrial gases companies in the U.S. market a broad range of industrial gases although they may not produce all of them (Flamm 213-15; Baker 363, 372-73; Heckel 730; Kimerling 855; Cunningham 917, 923-24). The principal industrial gases companies market essentially the same products (Baker 373). As one industry witness stated, the industrial gases business consists basically of the heavy investment in air separation gases and such others of a "package of gases" as can be marketed profitably (Dempster 555; Flamm 213-15; Baker 363, 372-73; Heckel 730; Kimerling 855; Cunningham 917, 923-24). Both BOC and Airco market a wide range of industrial gases (Smith 1797-99; Giordano 1904-05, 1913-14). Industrial gases companies market industrial gases that they do not produce in order to provide their direct customers and their dealers a synergistic or total marketing package (Flamm 215-16; Cunningham 923). It is necessary for industrial gases companies to market a full or broad line of gases in order to compete effectively (Flamm 215-16; Baker 373-74; Heckel 730; Kimerling 855). Customers of industrial gases companies prefer to purchase their total gases requirements from a single supplier (Baker 374; Heckel 730-31; Smith 1800). While some industries may use certain industrial gases more than others, most industries generally use a wide range of industrial gases (Baker 431-32; Dempster 569).

41. The production, transportation and marketing of industrial gases require substantial, complex and specialized technical knowledge and expertise (Flamm 233-37; 351; Baker 383-86; Dempster 526-27; Kimerling 872-73). The atmospheric gases -- oxygen, nitrogen, argon, krypton and xenon -- are produced commercially by the cryogenic liquifaction and fractional distillation of air. Air consists of about 78 percent nitrogen, 21 percent oxygen, and 1 percent argon

and traces of other elements, including krypton and xenon (CX 3352). It is cooled to approximately -300° F, at which point it is a liquid, and the elements are separated by virtue of their different boiling points (Kridl 2132-33, 2139; Flamm 264-66; Baker 368). Air separation plants necessarily produce oxygen and nitrogen as co-products, although in many instances only one product is marketed while the other will be vented (Kridl 2159-61). These plants can be designed so as to derive argon, krypton and xenon in addition (Dempster 515; Kridl 2165). Regardless of the purpose for which it is used, all oxygen is identical and is produced in similar plants (Baker 372; Loveman 603; Cunningham 954; Kuehn 1145). Gases produced in air separation plants accounted for over 63 percent of the total value of all industrial gases shipments by primary manufacturers in the United States in 1972 as reported by the Bureau of the Census (CX 312C-D). The science of cryogenics or low temperature is also used in the production of other industrial gases such as helium and hydrogen (Flamm 271-72, 275). Other industrial gases such as hydrogen and carbon monoxide are also produced together in the same plants (Baker 425). Operation of cryogenic facilities for the production of industrial gases requires highly specialized knowledge and can be quite hazardous to the people concerned as well as surrounding communities (Baker 384).

42. The industrial gases industry has two marketing aspects: tonnage and merchant. Tonnage refers to the supply to customers whose demand at a particular location is sufficient to justify the construction of a plant at or near the customer's facility which is devoted entirely or primarily to providing that customer with gaseous product delivered through a pipeline (Flamm 317-19; 329; Giordano 1914-15, 1917-18). Typical tonnage users include Ford Motor Company, U.S. Steel, Bethlehem Steel, Armco Steel, Republic Steel, Allied Chemical, McLough Steel and National Steel (Giordano 1917; Baker 442-43; Perkins 802-03; Flamm 290-96). Merchant refers to other sales of gases, which take place in much smaller quantities and in which the gas is transported to the customer by truck or rail (Giordano 1985-86). The merchant side of the business is also composed of two segments: bulk liquid and cylinders. Bulk liquid refers to gases shipped in relatively large quantities in liquid form (Giordano 1914-15; Flamm 318-19). In cyliner distribution, the gas is distributed in gaseous form under high pressures in small metal cylinders (Giordano 1926).

The only gases which are produced and sold in the United States on a tonnage basis are oxygen, nitrogen and hydrogen (Giordano 1918). Gases distributed as bulk liquid include oxygen, nitrogen, argon, hydrogen, carbon dioxide and helium (Giordano 1927-28). All of the gases are sold in cylinders.

43. Gases that are manufactured as liquids for economics of distribution are transported in bulk form in tank cars or trucks. Bulk liquid gases are used either as liquids or are converted by vaporization and used as gases (Flamm 317-19; Giordano 1913-16, 1927-28). Plants used to supply gases to customers either in liquid form or as gas in cylinders are referred to as merchant plants. It is common, however, for on-site tonnage plants to have merchant capacity, i.e., incremental to that required to supply on-site users, and used to supply other customers (Flamm 317-19; Giordano 1913-14, 1917-18, 1927-28; Baker 2740-41). The marketing of bulk liquid gases and cylinder gases requires special skills and equipment designed to withstand extreme temperatures. The products are shipped over highways in conformance with rather strict Federal regulations and delivered to especially designed containers where it is stored and released to meet individual customer needs. All of this equipment is very specialized and used almost exclusively within the industrial gases industry (Baker 384; Kridl 2137). Industrial gases are also marketed through a network of independent distributors (Flamm 218-19, 300, 344-45; Baker 428, 2757; Dempster 574; Loveman 578; Cunningham 623).

44. The cluster of products and services offered by industrial gases companies, the common technology and specialized equipment utilized in the production, distribution and marketing of industrial gases by the industry, the identity of marketing methods and customers, the recognition and identification by the industry members of only other industrial gases producers and sellers as their competitors, trade associations which recognize only industry members, and the reporting system utilized by Federal agencies over a long period of time all clearly establish the industrial gases industry as a relevant line of commerce for analyzing the effects of the challenged acquisition (Findings of Fact 32-43).

b. Relevant Geographic Market

45. The three largest industrial gases companies in the United States -- Linde, Air Products, and Airco, all produce and market industrial gases throughout the United States (Flamm 231; Baker 395-96; Giordano 1922, 1938, 2005-06; Airco Admissions, Pars. 3, 9, filed April 10, 1974). Airco bids for both tonnage and merchant accounts nationwide (Giordano 1922). Chemetron, Inc., another major producer, markets industrial gases throughout virtually all the United States (Cunningham 920). The smaller companies which sell industrial gases in tonnage quantities do not sell nationwide. Big 3 sells only in the southern part of the country (Flamm 321). Liquid Air sells no significant amount in the Northeast and Midwest (Dempster 544). Burdett of Cleveland sells primarily in the Midwest (Loveman 580). The other smaller companies are even more localized; i.e., Northern Gases (Milwaukee and Wisconsin), and Alabama Oxygen (Alabama, parts of Florida, Georgia, Mississippi, and Tennessee)(Heckel 731; Kimerling 856-57).

46. The cost of distributing merchant quantities of industrial gases is substantial and this high distribution cost limits the distance to which most industrial gases can be shipped economically. Oxygen and nitrogen are usually not shipped more than 100 to 300 miles (Flamm 319-17; Baker 448-49; Kimerling 882-83; Giordano 1928, 2019-20; Kridl 2180). Argon can be shipped somewhat longer distances (Flamm 320-21; Giordano 1928), but carbon dioxide is normally shipped shorter distances (Giordano 1928; see Flamm 338). Hydrogen can be marketed within 200 to 600 miles of the producing plant (Kimerling 882-83; Giordano 2007). Helium, since it is not commercially available in many parts of the world, is shipped much greater distances than are other industrial gases (Giordano 1928). The major producers are able to market merchant gas nationwide because they have numerous producing plants located throughout the United States; i.e., Linde has 70 to 100 plants, Air Products has a substantial number of plants, and Airco has at least 51 plants (Flamm 231; Baker [illegible]).

47. [illegible] was interested in becoming a nationwide competitor in the U.S. industrial gases market. According to [illegible]'s Chairman, [illegible] would need more than 5 percent of the national market in order to become a viable competitor;

and that had BOC acquired a small company, BOC would have been interested in expanding it into a national company (Smith 1837). The scope of Airco's operations throughout the United States was one of the primary reasons BOC chose to acquire a stock interest in Airco; it gave BOC national scope in one jump (Smith 1732-36).

48. Since the major industrial gases companies compete nationwide in both the tonnage and merchant segments of the industrial gases market, and since BOC's interest in the United States industrial gases market was on a nationwide basis, the relevant section of the country or geographic market in which to determine the probable competitive effects of BOC's stock acquisition of Airco with respect to the industrial gases market is the United States as a whole (Findings of Fact 45-47).

C. Market Performance and Concentration

(1) Growth and Demand

49. The United States industrial gases market is the largest industrial gases market in the world (Baker 391; Dempster 541; Smith 1728; Laister 2557). The industrial gases market in the United States is growing rapidly and many new applications for industrial gases have been developing (Flamm 245-46; Baker 391, 2718-19, 2722-23; Heckel 735; Cunningham 925-26). Industry witnesses anticipate an annual growth rate of up to 10 percent over the next 5 years (Baker 2719; Flamm 246). The U.S. market is, in fact, the most dynamic of the industrial gases markets in the world and presently provides more new business opportunities than all the other industrial gases markets in the world combined (Baker 2718).

50. Two significant new applications for industrial gases in the United States have been the development of nitrogen food freezing and the use of industrial gases in sewage treatment. The shortage of petroleum products has brought about additional new applications for industrial gases. Industrial gases are now being used in the production of synthetic natural gas or low-BTU gas that can be used for commercial purposes or in power generation. The elevated price of oil has also led to the production of gas for pipeline transmission by the combustion of coal with oxygen. Additionally, industrial gases are now being used to generate

basic chemical feedstock for a number of chemical products such as fertilizers and methanol. These new applications have created demand for large tonnage plants by public utilities and by chemical companies. The scarcity of natural gas has also made economically prohibitive the use of ammonia for generating nitrogen for metallurgical processes. This has further increased demand for nitrogen produced by air separation. Another new application for industrial gases is by the steel industry. The high price of scrap metal has resulted in steel companies using liquid pig metals to produce more steel rather than melting scrap. This new technique increases the requirements of steel companies for oxygen (Baker 439-41, 2716-18, 2724-25; Heckel 735; Cunningham 925-26). The industrial gases market as of 1974 is "very buoyant", one industry witness testified (Baker 2716).

51. The new applications for industrial gases and the very high level of economic activity in the United States have led to substantial growth of the U.S. industrial gases market (Baker 2718). During the last 2 years, the volume of industrial gases shipments by Air Products, for example, has increased 50 percent for merchant gases and 25 percent for tonnage gases (Baker 2723). Further, Air Products' sales of industrial gases increased 25 percent from 1972 to 1973 (Baker 2771-72). The demand for the principal industrial gases products, particularly tonnage oxygen, has increased to such an extent that the engineering and manufacturing capacity of the U.S. industry is insufficient to meet the demand for construction of new plants (Baker 2727). Air Products has recently had to tell customers that it was unable to supply their requirements for new industrial gases plants (Baker 2760). Many of the industrial gases, particularly the air separation gases, have been in short supply in the U.S. in the last year to two years (Flamm 239-40; Baker 403-04, 437-38; Dempster 543-44, 556-57; Perkins 787; Kimerling 871-72; Cunningham 924-25). Some industrial gases are, in fact, in such short supply that Linde has had to allocate customers (Flamm 240).

(2) Pricing

52. Prices for industrial gases have also increased in the last 2 years (Baker 403, 2723; Kimerling 879; Cunningham 925). Linde increased prices 10-15 percent in

April 1974, which was followed by Airco (Flamm 304). The price controls of the Cost of Living Council, however, prevented industrial gases prices from rising as significantly as they might have (Cunningham 950). Mr. Baker of Air Products testified that prices have firmed since 1970, that marginal costing and marginal pricing have disappeared and full costing and full pricing have become the standard (Baker 2723).

53. There is no price data in the record as such. BOC respondents contend that price competition in the industry is extremely rigorous, and reference is made to testimony of industry executives (Dempster 556; Baker 436-37; Flamm 305). This testimony is, however, somewhat equivocal. Mr. Flamm of Linde stated that between Linde, Air Products and Airco -- "they argue their service is equal, I would say a fair amount of vigorous price competition." (Flamm 305). Further, this testimony, which is of the most general nature, must be viewed in perspective with the supply-demand situation existing during the past 2 years, and testimony that prices have firmed, marginal pricing has disappeared and full pricing has become the standard. Respondents also rely upon the observations in the Perham-Greenfield (BOC) report on the United States industrial gases market as of 1969-1970 (BOC RX 62). This report is, however, unreliable for the purpose of establishing actual price competition in the market, or the degree of price competition that actually existed. The report is not only self-serving, but it is double hearsay, consisting of what BOC officials reported industry executives told them. The report also covers the period 1969-early 1970. The supply-demand situation and industry pricing practices changed substantially from early 1970 to the end of 1973 when the challenged acquisition occurred (Findings of Fact 50-52).

54. BOC respondents placed several charts in evidence which demonstrate that actual unit value of major industrial gases has declined in recent years (BOC RX 246; BOC FF 123). Conclusions regarding prices have been drawn from data compiled by the Bureau of the Census on the total value and quantity of shipments of the various gases, f.o.b. plant, with the unit value (i.e., the ratio of total value of shipments to total quantity of shipments) used as an approximation of price. These conclusions have some validity when applied to the tonnage segment of the market because pipeline

distribution is cheap and distribution expense is not a significant cost element. In the merchant segment of the market the conclusions are meaningless because distribution costs are a significant factor in pricing, and the f.o.b. plant values utilized by BOC do not take into account such expenses. Further, declining unit value has little significance in establishing that the marketplace is highly competitive. The basic pattern in the industry has been an increase in volume purchased by individual customers and a trend toward pipeline delivery. Thus, the increasing use of tonnage oxygen with low delivery costs has had an averaging-down effect on the unit value of shipments. Economics of scale in production and delivery has also effected lower unit costs (Baker 2745-46).

(3) Structural Features

55. BOC respondents also contend that there are structural features of the industry which assure price competition and prevent oligopolistic pricing practices. These features are backward integration by tonnage users, the high fixed costs in the industry, concentration and economic power on the buyers' side, and product homogeneity (BOC PF 130 et seq.). There has been some vertical integration by large users of industrial gases into producing their own requirements of certain gases. The record, however, does not reflect any trend towards vertical integration, nor does it show any significant existing threat that customers will back integrate. The probable pricing effect of the threat of back integration is speculative; no direct evidence of effect has been presented. Back integration is not practical for all industrial gases. The record does not establish the percentage of potential customers which have vertically integrated. Further, the potential for integration is confined to tonnage customers; it has no effect on the merchant market. The record does establish that potential customers which might seek to back integrate must look, in large measure, to industrial gases companies to construct a plant (Smith 1669). In periods of shortage, such as existed in the market in 1973-1974, industrial gases companies were over-committed and were refusing requests to construct plants (Baker 2727). Thus, the threat of back integration is minimal. Back integration by large buyers is present in many industries and there is no showing that

the effect of such possibility on pricing in the industrial gases industry is more significant or as significant as in other industries. In fact, the record does contain evidence that back integration has had little effect on pricing. Air Products, a major industry factor, normally makes a profit on tonnagegases(Baker 2741). Industry witnesses testified that companies that have back integrated normally sell any surplus production to an industrial gases company for distribution to the general market (Baker 2744; Flamm 345). Further, the companies that have to some extent back integrated, are not looked upon as possible entrants into the industrial gases industry (Baker 443, 2743-44).

56. A significant feature of the industrial gases industry is the fact that fixed costs are quite high in relation to the total cost of producing atmospheric gases. The largest elements of cost are depreciation on the physical plant and power cost. Because of this, BOC respondents argue that as a matter of economic theory, there should be extreme price competition in the industry, citing F. Scherer, Industrial Market Structure and Economic Performance, 192-198 (1970). As complaint counsel point out (CCRB, p. 28), according to Dr. Scherer, as a matter of economic theory there should be price competition in high fixed cost industries during periods of oversupply and overcapacity, but in actual practice firms in high fixed cost industries avoid price competition. As explained by Mr. Scherer:

> "Recognizing the temptations confronting them, firms in high fixed cost industries seem to exercise extraordinary restraint in their pricing actions, and when tacit restraint fails, they have an unusually high propensity to scurry into formal collusive agreements." (Id. at 195).

In recent periods, there has been a very tight supply situation in industrial gases. Thus, the economic theory relied upon by BOC respondents can be given little weight in establishing extreme price competition.

57. For reasons already stated, BOC respondents' other two arguments, economic power of the buyers and product homogeneity, afford little proof of extreme price competition. A substantial part of the industrial gas market -- the merchant market -- is composed of small purchasers. Even the large purchasers of certain gases purchase other gases

in small quantities. Thus, the economic power of the buyers is lessened by other market factors. The effect of product homogeneity on pricing is tempered by an emphasis on service competition (Flamm 305). There is some indication that instead of extreme price competition, the dominant firms in the industrial gases market engage in interdependent and parallel behavior. At a private meeting on September 6, 1973, Airco's Chairman, George Dillon, told Mr. Smith, BOC's Chairman, that the U.S. industrial gases market had stabilized, and "the three main competitors no longer encroach on each others' area of domination." (CX 95D). Therefore, the evidence of record does not support a finding of extreme price competition.

(4) Profitability

58. BOC respondents contend that the industrial gases industry has not been profitable in comparison to other manufacturing and chemical industries (BOC PF 151 et seq.). BOC's reliance is based upon consolidated returns of industrial gases companies which are engaged in many lines of business (BOC RX 254). Consolidated returns of corporations engaged in several lines of commerce shed little light on the profitability of individual segments of their business. RAX 7, Airco's 1973 Annual Report, shows that in 1973, industrial gases, cryogenic, welding and cutting equipment accounted for 44.9 percent of sales and 52.7 percent of earnings; in 1972, these divisions accounted for 48.7 percent of sales and 60.8 percent of earnings. Thus, this segment of Airco's business was more profitable than the other segments. BOC respondents also claim, on the basis of Dr. Andrew Kridl's testimony, that the industrial gases operations of the diversified companies are less profitable than their other operations (Kridl 2196-98). Dr. Kridl's testimony, however, is diametrically opposed by the Stanford Research Institute study in which Dr. Kridl participated. The S.R.I. study concludes that the industrial gases portion of the operations of these diversified companies is more profitable than the other activities of the companies (CX 345J, in camera; see CX 345C, in camera). The S.R.I. study also indicates that the U.S. industrial gases market is more profitable than industrial gases markets in Western Europe (CX 345I, in camera; see also 345M, in camera). Thus, the record evidence on profitability is equivocal at best. No hard evidence on rate

of return on industrial gases was placed in the record. BOC's attempt to utilize information in the Commission's investigative files on rates of return produced summaries of doubtful probative value (BOC RX 254; Topkis 2693). The record is clear, however, that no industrial gases company has abandoned the market, or any segment of the market because of low profitability. In fact, the major companies are expanding capacity rapidly (Flamm 289, 322-23; Baker 438, Dempster 558; Giordano 1962-63, 1991-92).

(5) Concentration

59. Firms that produce and sell industrial gases are required by law to report to the Bureau of the Census the quantity and net selling value, f.o.b. plant, of the industrial gases produced and shipped by them (CX 299A-D; CX 300A-D; CX 298A-D). The Bureau of the Census publishes annual reports entitled "Current Industrial Reports" of the yearly shipments of industrial gases by manufacturers classified in the industrial gases industry, SIC 2813 (CX 312A-K).

60. The Bureau of the Census also publishes a "Census of Manufacture" report which sets forth for every fifth year the value and quantity of industrial gases shipments by all manufacturers (CX 296A-F). The manufacturers not classified under SIC 2813 that produce industrial gases are those companies which produce industrial gases as other than their primary product at a given establishment; generally such gases are produced for their own use. These companies occasionally have surplus gases which they generally wholesale to industrial gases companies on a spot basis (Flamm 345, 354-55; Baker 2743-44). These companies do not market industrial gases on the open market and are not considered by industrial gases companies to be part of the industrial gases industry (Flamm 345-46; Kimerling 885; Cunningham 952-53; Baker 2743-44). Accordingly, those companies are not part of the relevant market in this proceeding (Finding of Fact 67).

61. The total value of industrial gases shipments f.o.b. plant in the U.S. for 1972 reported to the Bureau of the Census by those firms primarily engaged in the manufacturing of industrial gases for sale was $595 million (CX 296A). The total value of industrial gases shipments

f.o.b. plant in the U.S. for 1972 reported to the Bureau of the Census by all manufacturers was $649 million (CX 296A).

62. See Confidential Finding of Fact.

63. The total value of industrial gases shipments f.o.b. plant for 1972 reported to the Bureau of the Census by the four largest U.S. producers and marketers of industrial gases was $414 million. The total value of industrial gases shipments reported by the four largest producers and marketers of industrial gases accounted for 69.6 percent of the total value of industrial gases shipments for 1972 by all primary manufacturers of industrial gases and 63.8 percent of the total value of industrial gases shipments for 1972 by all manufacturers (Confidential Finding of Fact 62).

64. The eight largest producers and marketers of industrial gases in the United States in 1972 were Linde, Air Products, Airco, Chemetron Corporation, Liquid Air, Inc., Big Three Industries, Liquid Carbonics Corporation, and Burdett Oxygen Company of Cleveland (Flamm 227-29; Baker 366-67; Heckel 746; Hines 757; Kimerling 864; Cunningham 921-22). The total value of industrial gases shipments f.o.b. plant for 1972 reported to the Bureau of the Census by the eight largest producers and marketers of industrial gases in the United States was $514 million, as adjusted on a pro forma basis to include the acquisitions of Liquid Air (Confidential Finding of Fact 62). The total value of industrial gases shipments reported by the eight companies accounted for 86.5 percent of the total value of industrial gases shipments for 1972 by all primary manufacturers and 79.3 percent of the total value of industrial gases shipments for 1972 by all manufacturers (Confidential Finding of Fact 62).

65. Over the past 5 years, top four concentration in the U.S. industrial gases market has increased significantly from 67 to 70 percent while top eight concentration has increased from 84 to 86.5 percent, based on total shipments by all primary manufacturers of industrial gases.

Concentration Ratios From 1967 to 1972
Industrial Gases; SIC 2813

Value of Industry Shipments 2/

Year	Top 4 Concentration	Top 8 Concentration	Source
1967	67	84	BOC RX 72F
1972	70	86.5	CX 296A; CX 325A, in camera; Flamm 221;

(Confidential Finding of Fact 62)

66. The increase in concentration in the U.S. industrial gases industry, as shown above, is also demonstrated by record evidence that there has been a considerable decrease in the number of industrial gases firms in the last 15 years as a result of acquisitions and mergers. Both Air Products and Liquid Air, Inc. have made significant acquisitions of industrial gases companies during this period. Air Products acquired three industrial gases producers in 1961: Southern Oxygen Company, Delta Oxygen Company, and Hill Industrial Gas Company. At the time of their acquisitions, these three companies had sales of approximately $12 million, $3 million and $1.5 million, respectively (Baker 409-11). Canadian Liquid Air Ltd. entered the U.S. industrial gases market in 1968 by acquiring American Cryogenics, Inc. American Cryogenics, Inc. later became Liquid Air, Inc. Subsequently, Liquid Air, Inc. acquired Industrial Air Products of Oregon in 1969, Gulf Oxygen Company of Lake Charles, Louisiana, and Dye Oxygen of Phoenix, Arizona, as of 1973. At the time of its

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2/ Value of industry equipment figures as reported for 1967 are not strictly comparable with 1972 data. Shipments included in 1967 data but not included in 1972 data are values of all secondary products primary to other industries, values of miscellaneous receipts for contract work on materials owned by others, scrap, salable refuse, repairs, etc., and value of resales i.e., products resold in the same condition as bought (72F, n. 3).

acquisition, American Cryogenics had industrial gases sales of approximately $13.5 million per year. The other companies at the time of their acquisition by Liquid Air had industrial gases sales of approximately $7.7 million, $3 million and $6 million, respectively (Dempster 511, 518-19, 528-30, 552). A number of other small companies have also gone out of existence during this period through acquisitions and mergers (Kimerling 861-62; Baker 407-08).

67. BOC contends the Census universe relied upon by complaint counsel is not a meaningful universe because the value of shipments excludes gases produced for consumption in the producing plant; the data excludes hydrocarbon gases such as propane, butane, propylene; sulphur dioxide and chlorine; and the value of helium produced in government plants (BOC PF 161-65). BOC's contentions, while factually accurate, are without merit. The relevant market, as previously found, is the production and distribution of industrial gases by the industrial gases companies. Industrial gases produced for in-house consumption are not part of this market as such gases are not resold in the marketplace (Flamm 345). Further, the industrial gases industry does not consider such production a part of the industrial gases business (See Flamm, 294-95). Hydrocarbon gases such as propane, butane and propylene are not considered part of the industrial gases industry, but a part of the petroleum industry (See Finding of Fact 39; Baker 426). Chlorine is not considered an industrial gas (Flamm 319; Kridl 2140). The record contains little evidence of the value of helium produced in government plants; however, the government does not participate in the industrial gases industry and hence is not part of the relevant market in this proceeding.

68. The Census figures showing value of shipments of industrial gases produced by all producers is $649 million in 1972, as compared to value of shipments of industrial gases produced by plants classified in the industrial gases industry of $595 million. This difference in value of $54 million could be accounted for by production by back-integrated producers who have a surplus, or by petroleum companies and chemical companies that have a surplus of in-house industrial gases production. The record establishes that this production is primarily sold to industrial gases companies which resell in the marketplace (Flamm 272, 354-56; Giordano 1924-25). Thus, this production is marketed by industrial gases companies although not reflected in Census figures for the industrial gases industry.

69. The universe figures utilized by complaint counsel and adopted by this Initial Decision do not include industrial gases sold by industry companies but not reported to the Bureau of the Census in SIC 2813, such as propane, etc. To this extent the total universe figures are understated. However, as previously found, these gases account for an insignificant percentage of sales by industrial gases companies (See Finding of Fact 39).

70. In sum, industry concentration figures proposed by complaint counsel based on Bureau of the Census reports and heretofore found (See Findings of Fact 62-65) appear to be an accurate basis upon which to assess industry concentration and to evaluate the economic effects of the challenged acquisition of Airco by BOC.

(6) Barriers to Entry

71. There are substantial barriers to entry into the production and marketing of industrial gases in the United States. The principal barriers to entry into the U.S. industrial gases market are high capital cost, technical knowledge and expertise, and marketing capability (Flamm 233-37; Baker 383-86, 2734-35; Dempster 526-27; Kimerling 872-73; Cunningham 944).

72. The production and marketing of industrial gases in the United States is capital intensive. Substantial capital is needed for production plants. For example, the cost of a 250-ton air separation plant and related equipment is $7 or $8 million dollars (Cunningham 944). Large plants cost up to $16 million (Giordano 1939-40). There is a considerable time lapse between the decision to build and the actual construction of an industrial gases plant. The time for bringing an air separation plant on stream can be as long as two years (Flamm 835).

73. A high degree of technical expertise, particularly in the field of chemical engineering, is required to produce and transport industrial gases. The cryogenic facilities which produce atmospheric gases are operated at extremely low temperatures and can be hazardous to employees and the surrounding community if misoperated. Many industrial gases are distributed at low temperatures in bulk liquid form and must be transported in specially constructed vessels and equipment designed to withstand

extreme temperatures. Additionally, there are strict federal regulations which must be adhered to in shipping industrial gases (Baker 384, Giordano 1915-16).

74. The marketing of industrial gases requires an in-depth understanding about how the gases are produced and purified and how their integrity is maintained. Marketing also requires a thorough knowledge of the physical and chemical properties of industrial gases as the gases are used in a wide range of industries and each industry has many different applications. Knowledge of the unique applications of industrial gases by customers in different industries is therefore paramount to success in the marketing of industrial gases (Baker 384-85; Dempster 527; Kimerling 872). Further, a firm needs an established reputation as a technically sound supplier of industrial gases before its products will be accepted in the marketplace. A company that is not known in the marketplace as a technically sound supplier of industrial gases cannot achieve marketing success in the U.S. market simply by employing three or four people with previous marketing experience (Flamm 351-52; Baker 2734-35; Laister 2671).

75. The necessity of technical and marketing experience and capabilities for successful entry into the U.S. industrial gases market is clearly demonstrated by the unsuccessful attempt by Standard Oil of New Jersey (now Exxon, Inc.) to enter the U.S. industrial gases market by acquiring American Cryogenics, Inc. Standard's expertise was not in the industrial gases field and American Cryogenics, Inc. at the time Standard sold it to Canadian Liquid Air was losing $4 million a year on sales of $20 million. Canadian Liquid Air did have the necessary expertise and capabilities to produce and market industrial gases and consequently turned American Cryogenics, Inc. into a profitable operation (Dempster 518-21, 526-27).

76. In contrast to the many U.S. industrial gases firms that have gone out of existence in the last 15 years, there have been only two entrants of any consequence that have come into the market during the period, both entering by acquisition. Canadian Liquid Air entered the U.S. market by acquiring American Cryogenics, and Houston Natural Gas entered by acquiring Liquid Carbonic (Baker 406; Dempster 519-19).

D. Competitive Impact of the Acquisition

(1) The Combination of BOC and Airco

77. Airco produces and markets industrial gases throughout the United States, and it is one of the largest firms in the industrial gases market in terms of value of shipments (Giordano 1922, 38; Finding of Fact 62, in camera). Airco is therefore not a toehold (Topkis 913).

78. BOC produces and markets industrial gases in a multitude of countries and is reportedly the second largest industrial gases company in the world (Flamm 262; see also Smith 1801-08). Prior to BOC's stock acquisition in Airco, BOC was the only one of the three largest industrial gases companies in the world that was not operating in the United States. The largest industrial gases company in the world prior to BOC's acquiring a stock interest in Airco was thought to be L'Air Liquide, and the third largest was Linde (Flamm 262). L'Air Liquide and Linde are already in the U.S. industrial gases market. L'Air Liquide entered the U.S. market through its Canadian affiliate, Canadian Liquid Air, which acquired American Cryogenics, and operates in the United States as Liquid Air, Inc. (Dempster 518-19).

79. See Finding of Fact , in camera.

(2) Elimination of BOC as a Perceived Potential Entrant

80. BOC was recognized by members of the industrial gases industry in the United States as one of the few firms possessing the capital resources, technical knowledge and expertise and marketing capability required to successfully enter the U.S. industrial gases market (Flamm 237-38, 248-51; Baker 385-86; Dempster 543, 561; Muller 681; Giordano 1992). Further, BOC was recognized by Linde and Air Products, two of the largest firms in the industry, as the firm most capable of entering the U.S. industrial gases market (Flamm 250; Baker 390). Additionally, BOC was one of a few firms perceived by members of the industrial gases industry in the United States as being able to enter and likely to enter into the U.S. industrial gases market (Flamm 251-52, 335; Baker 393; Loveman 594; Muller 681-83; Kimerling 876).

Linde and Air Products perceived BOC as the firm most likely to enter the U.S. industrial gases market (Flamm 251-52; Baker 393). Linde had considered BOC a potential entrant for the past two to three years (Flamm 335). Mr. Loveman of Burdett of Cleveland testified that "... over the next five years, I would expect that they [BOC] would [enter the U.S. market] in some connection." (Loveman 594).

81. BOC's interest in entering the U.S. industrial gases market was well known throughout the U.S. industrial gases industry. BOC participated in the manufacturing and selling of industrial gases production facilities in the United States through a joint venture with Airco from 1967 through 1971 (Finding of Fact 5; Smith 1717-19, 1810; Giordano 1948-50; Laister 2535). During 1969-1970, BOC investigated the industrial gases industry in the United States for the purpose of entering the market and while doing so contacted numerous industrial gases firms in the U.S. market (CX 232A-Z-47, in camera). Further, in every year from 1970 through 1973, BOC representatives met with firms in the U.S. industrial gases industry to consider possible acquisition of those firms by BOC (See infra, Findings of Fact 90, 93, 96-102). It was generally known throughout the industrial gases industry in the United States that BOC had contacted firms in the industry about possible acquisition (Flamm 257-58; Dempster 545-46). Industry witnesses on cross-examination testified that their pricing and marketing decisions had not been affected by the perceived potential entry of BOC (Flamm 336-37; Dempster 567-68; Kimerling 881-82; Baker 446).

82. Aside from BOC, the only other firms considered by members of the industrial gases industry in the United States as possible entrants into the U.S. market were Messer Greisheim and Linde A.G., both of Germany, and AGA of Sweden (Flamm 250; Baker 390). Messer Greisheim and Linde A.G. operate as a joint venture in entering markets outside of Germany (Baker 2747-48). Linde A.G. lacks BOC's marketing skills as it is primarily a manufacturer of industrial gases plants for sale to others. Its marketing area for industrial gases is limited to Germany, Central Europe and South Africa (Muller 719-20). Messer Greisheim does not have the technology nor marketing capabilities of BOC and does not market industrial gases to any extent outside of Germany (Muller 720-22). BOC was of the opinion that Messer Greisheim's interests lay in other directions than industrial gases (CX 76L, in camera). AGA of Sweden was perceived as having some

of the prerequisites for entry; however, its resources were questionable (Smith 1760; CX 76L). Although Japanese companies have the resources and technology to enter the U.S. industrial gases market, none has ever invested in industrial gases markets outside Japan (Smith 1761).

83. None of the companies in the United States which operate industrial gases plants for their own use [vertically integrated] are considered potential entrants into the industrial gases market by members of the U.S. industrial gases industry, nor are they considered to have the expertise and capabilities needed to enter into the open market sales (Flamm 346; Baker 443-44, 2743-44; Dempster 564). None has entered the industrial gases market to date; all have sold their surplus production, if any, to industrial gases firms (See Finding of Fact 55). Thus, it is concluded that BOC was the most likely potential entrant into the U.S. industrial gases market and was so perceived by members of the industrial gases industry.

(3) Elimination of BOC as an Actual Potential Entrant

(a) BOC's Incentives for Entry Into the U.S. Market

84. The Board of Directors of BOC was convinced that it was in BOC's economic interest to further expand its international operations. On February 25, 1974, in a statement to shareholders, Mr. Smith, chairman of BOC, declared that the acquisition of 4 million shares of Airco stock enabled BOC to pursue its "long-term objective." Further, Mr. Smith explained that BOC's future lies in expanding its international operations, especially in industrial gases and equipment (CX 292D, H).

85. The history of BOC demonstrates its commitment to expansion of its industrial gases operations throughout the world. BOC began as a small Scottish company toward the end of the last century. Its industrial gases operations eventually extended throughout the United Kingdom and Ireland. By 1955, BOC had expanded beyond the U.K. into the following countries: Australia, South Africa, Canada, India, Pakistan, Singapore, Malaya, Hong Kong, East Africa, Rhodesia, the Philippines, Fiji, and New

Guinea (Smith 1800-03). Since 1956, BOC has expanded into Italy, Indonesia, Thailand, Bangladash, and most recently into Brazil (Smith 1806-07). On August 18, 1969, BOC's Chairman stated that it was BOC's "declared policy" to become more "truly international." (CX 36A-B; Muller 652; Smith 1723, 1822). BOC officials realized that BOC could not operate as a truly international industrial gases company without being in the U.S. industrial gases market (Smith 1728-29, 1731; Laister 2557, 2659).

86. In addition to BOC's commitment to becoming a truly international company (which would involve entry into the U.S. market), there were several other significant incentives for BOC's entry into the industrial gases market in the United States. First, the U.S. market is the largest industrial gases market in the world and also the most important and advanced market in the world (CX 36A-B; Smith 1728; Laister 2557). BOC also regarded the United States as the strongest economy in the world, and one that still enjoyed a respectable growth rate (Giordano 2000-01). Over the past two years, the growth rate in the United States for industrial gases has been substantial and this growth is projected to continue (Baker 2722-23).

87. Further, BOC desired to be "in tune" with the U.S. industrial gases market not only because of its size and opportunity for growth, but also because it is a source of substantial new technology (Smith 1728). The U.S. market presently provides more new applications for industrial gases than all the other industrial gases markets in the world combined (Baker 2718; Findings of Fact 49-51). Also BOC had determined that it was to its advantage to be in the U.S. market, as its major international competitors participate therein (Smith 1729; Laister 2658). BOC planning documents prepared in August 1969, stated that "[T]here must be competition with American-based international corporations on their home grounds, at least in certain selected businesses, if [BOC] is to be confident of survival internationally against American-based firms." (CX 38C.)

(b) BOC has the Capital Resources, Technical Knowledge and Marketing Expertise for Entry into the U.S. Industrial Gases Market

88. BOC has the necessary capital to enter the U.S. industrial gases market (Topkis 237, 874; Smith 1760).

The establishment by BOC of approximately 40 subsidiaries in countries around the world attests to BOC's immense capital resources (Smith 1644-45). Sales in fiscal 1973 for the BOC group were approximately $765 million (CX 292Q). Capital employed in 1973 for the group was over $715 million (CX 272Z-3), total assets were $906,412,000 as of September 30, 1973, with current liabilities and provisions of only $272,467,000 (CX 292S).

89. BOC has the technical and marketing expertise to enter the U.S. industrial gases market and was so viewed by Airco and other industry members (Topkis 237, 874-75; Flamm 248, 249; Baker 383-85; Dempster 543; Muller 697; Smith 1760; Giordano 1950, 1992). BOC's history of entering industrial gases markets around the world clearly demonstrates BOC's marketing, organizational and managerial skills. Of the 19 countries outside the U.K. that BOC has entered for the production and marketing of industrial gases, 14 were de novo entries; 5 were entries by acquisition of small companies (Smith 1803-07). BOC has become the dominant company in many of the industrial gases markets it has entered (CX 301Z, in camera). The executive of the largest industrial gases company in the United States testified that the same marketing expertise BOC exploited in entering industrial gases markets throughout the world could be used by BOC to enter the industrial gases market in the United States (Flamm 238). Further, BOC has already had the benefit and experience of participating in the U.S. industrial gases market from 1967 to 1971 through its joint venture with Airco in the marketing of industrial gases production plants (Airco Admissions, Pars. 87, 88, filed April 10, 1974; Kimerling 876; Smith 1717-19, 1810; Giordano 1948-50; Laister 2535).

(c) BOC's Investigation of Methods of Entry Into the U.S. Industrial Gases Market

(i) Dr. Muller's Consultancy

90. BOC has actively pursued various possible means of entering into the U.S. industrial gases market since at least 1968. In April 1968, BOC entered into a consulting agreement with Dr. Albert Muller. One of the primary responsibilities of Dr. Muller was the development of promising business opportunities for BOC in the United States (CX 111A). Dr. Muller has a strong background in industrial gases (Muller 648).

On behalf of BOC, Dr. Muller contacted several U.S. companies in 1968, including the Clinton Oil Company, for the purpose of a possible joint venture in helium, Will Ross, Inc., with respect to the possible acquisition of its Mathieson Special Gases Division by BOC, and Gardner Cryogenics ("Gardner") regarding possible acquisition of that company by BOC (CX 186L-N; Muller 654-55). Canox, the Canadian subsidiary of BOC, had previously considered acquiring Gardner, which is a producer and marketer of helium in the United States (CX 208Z-66). At the time of Dr. Muller's contact, BOC gave serious consideration to acquiring Gardner. Dr. Muller held several meetings with William Gardner, president of Gardner. BOC also had a study made of the possibility of acquiring Gardner (CX 15A-Z-8, CX 17).

91. In 1969, BOC adopted a policy of becoming more truly international and accordingly sought "profitable opportunities to extend its operations in the world's most important and advanced market." (CX 36A). BOC's management had decided that BOC should enter the U.S. market in its major lines of business (Muller 653, 656-57). In order that more attention could be devoted to this task, J. A. Perham, president of Canox, was directed to assume responsibility for all such activity. To permit Mr. Perham to devote the necessary time to this task, A. R. Dow was appointed executive vice president of Canox, relieving Mr. Perham of the responsibility for day-to-day operations of Canox (CX 36A-B; Muller 653, 656). Dr. Muller and Mr. Perham worked together in assessing and recommending profitable business opportunities in the United States to BOC (CX 29A). They were to devote their attention to product lines which were the same or complimentary to BOC's. They were to seek companies having sales between $1-50 million. Acquisition candidates with sales of $5-20 million were considered desirable by BOC (CX 29C-D).

92. In October 1969, Dr. Muller was told by the chairman of BOC to terminate all activities other than searching for opportunities for BOC in the U.S. industrial gases field (CX 42, CX 248A-B). In December 1969, the chairman of BOC informed Dr. Muller that BOC was going to be represented in the United States; the only questions were what, how, when and where (CX 47A).

93. As part of an overall study of the industrial gases market in the United States conducted by BOC between December 1969 and February 1970, Dr. Muller contacted

several distributors of industrial gases in the United States for BOC (Muller 661-62; CX 121A).

94. In the spring of 1970, when Dr. Muller's consultancy contract expired, BOC instructed Dr. Muller to continue to forward to BOC any attractive prospects he discovered in the United States (CX 113, 114; Muller 669-70). In the summer of 1970, BOC employed Dr. Muller to assist Allan Perham in a further effort to acquire Gardner (Muller 679-80). Throughout Dr. Muller's association with BOC, BOC continually stressed its intention to enter the U.S. industrial gases market (CX 42, 47A; Muller 668).

(ii) Perham-Greenfield Study

95. By 1969, BOC had made a definite decision to enter the U.S. industrial gases market (CX 40A, CX 246). In the fall of 1969, BOC's planning group prepared a detailed study of the U.S. industrial gases market (CX 44, CX 246). In December 1969, BOC decided to investigate in depth the U.S. industrial gases market (CX 47). An extensive investigation was undertaken during which BOC contacted many U.S. industrial gases producers (CX 47, CX 232A-Z, in camera). The report on this investigation was completed in February 1970, and it was recommended that BOC not enter the U.S. industrial gases market at that time, but that this conclusion should not be considered final and that BOC should continue to look for future opportunities in that market (BOC RX 62B, in camera). After February 1970, BOC continued to have acquisition negotiations with producers in the market (Findings of Fact 96-102).

(iii) BOC's Efforts to Acquire Chemetron

96. In November 1969, Mr. Johnson of Loeb, Rhoades and Company, an investment banking firm, was told by BOC that BOC was interested in acquiring a U.S. industrial gases producer, and in particular, Chemetron (Johnson 832-33). In January 1970, BOC discussed with Chemetron the possibility of BOC acquiring a majority of Chemetron's stock (CX 223A; Johnson 833-35). Subsequently, BOC discussed with Chemetron the acquisition of a minority position in Chemetron with the later possibility of obtaining control (CX 223, 224, 225A).

(iv) BOC's Efforts to Acquire Burdett of Norristown

97. On August 11, 1971, BOC discussed with Burdett Oxygen Company of Norristown (Burdett-Norristown) the acquisition of that firm and its affiliates by BOC. Also discussed at that time was the possible acquisition by BOC of National Welders, Selox, Alabama Oxygen and Gulf Oxygen (CX 250A; Perkins 792-93). Subsequently, a BOC official visited Burdett-Norristown to consider acquiring it (CX 254A, in camera). The visit by the BOC official lasted four days, during which he met all key personnel, inspected the plants and headquarters facilities and examined the books and records (CX 254A, in camera; Perkins 794-96). BOC continued to analyze Burdett-Norristown by checking out all the references Burdett-Norristown supplied to BOC (CX 254L-N, in camera; CX 255A-B, in camera). BOC subsequently informed Burdett-Norristown that although it was not then interested in acquiring the company, it had a continuing interest in the U.S. industrial gases market (CX 258).

(v) BOC's Efforts to Acquire Burdett of Cleveland

98. BOC considered Burdett Oxygen Company of Cleveland (Burdett-Cleveland) a likely acquisition candidate in 1969 (CX 40A). In 1969, BOC told Burdett-Cleveland that it would be interested if the company every wished to dispose of its operations (CX 216). Mr. Perham and Mr. Greenfield of BOC visited Burdett-Cleveland during BOC's 1970 study of the U.S. industrial gases market and recommended that BOC watch to see if this firm would become available (CX 232D-E, in camera).

99. Early in 1970, an investment banker told BOC that 50 percent of the stock of Burdett-Cleveland could be purchased for $4-5 million. In April 1970, BOC informed the banker that it would be interested in a majority position in Burdett-Cleveland (CX 233A, CX 234). After BOC was told it was then impossible to obtain control, BOC told the banker that if the situation changed it would still be interested (CX 243). In September-October 1970, BOC told Burdett-Cleveland and its bankers that it was interested in buying Burdett's Niagara Falls, New York, industrial gases plant (CX 244A, CX 245).

100. On October 15, 1973, BOC informed Burdett-Cleveland of its continued interest in acquiring Burdett-Cleveland (Loveman 592; see also Smith 1826). Burdett-Cleveland would not then sell out but stated it might do so within the next five years (Loveman 592). The interest expressed by BOC in Burdett-Cleveland convinced Mr. Loveman of Burdett-Cleveland that BOC would enter the U.S. industrial gases market at sometime in the future (Loveman 594).

(vi) Other Means of Entry Explored by BOC

101. Prior to the sale of Gulf Oxygen Company to Liquid Air, Inc. in 1972, a BOC representative asked John Hines of Gulf Oxygen Company if Gulf were for sale. Mr. Hines responded that it was not but that it would be available some day (Hines 759-60).

102. In 1972, BOC considered a joint venture with Chemetron to produce and market certain industrial gases, including oxygen and nitrous oxide (Keuhn 1155). BOC informed Chemetron during these discussion that it intended to enter the U.S. market for oxygen and nitrous oxide either on a "grass roots basis" or through acquisition (Keuhn 1152-53).

(d) Testimony of BOC Executives

103. The testimony of two of BOC's top executives was to the effect that BOC did not intend to enter the industrial gases market in the United States and that BOC would not have done so in the foreseeable future, but for the Airco transaction. Mr. Smith, chairman of the board of directors of BOC (Smith 1642), testified (1741-42, 1744):

> "Q . . . Had you not acquired a stock interest in Airco, would BOC have entered the American, United States, gases business in any way in the foreseeable future?
>
> [Colloquy Omitted]

"JUDGE BARNES: You may answer, Mr. Smith. Do you recall the question?

"THE WITNESS: Yes. I cannot conceive any circumstances whatsoever that would bring BOC into the American market in the foreseeable future, barring Airco."

Similarly, Peter Laister, a director of BOC since 1969 (Laister 2528, 2533), testified (2552-53):

"Q After the Perham-Greenfield report was received and considered [February 1970] (and before the meeting) which you had with merchant bankers which you have mentioned here today [regarding Airco in June 1973], did BOC have any intention whatever to enter the U.S. gases business either on a Greenfield [greenfield] basis or by acquisition?

"A There was no intention. Quite the reverse. We were quite determine[d], we decided when we had read the Perham-Greenfield report, that we would not enter on such a basis."

104. Mr. Smith testified that de novo entry would be extraordinarily costly. He estimated that it would be likely to cost $240 million and to take ten years to produce a viable national competitor, by which he meant a market share in excess of 5 percent (Smith 1835-36). He added that he could not "conceive the circumstances in which [he] would have persuaded [his] board to expend that amount of money and take that amount of time, and to have that deteriorating effect on [BOC's] return that they would have said yes." (Smith 1836-37). Entry by acquisition of a firm smaller than Airco was viewed by Mr. Smith as subject to most of the same difficulties as de novo entry.

105. These denials by BOC officials must be considered in the light of their other testimony given at the hearings. Mr. Smith testified that BOC had a stated objective of becoming a more international company (Smith 1723). In describing BOC's reasons for acquiring Airco, Mr. Smith testified that the first reason was BOC could work with Airco and:

"The second reason was that despite having had to turn our backs on the American market in the belief that there was no way in, the fact is that the American market is much the most powerful and largest in the world, and it must be of continuing interest to any company which has ambitions to act internationally.

The third reason is that the American market, partly as a result of its size, is the source of much technology, much new development, and we have to be in tune with that.

We have to keep pace with that.

And there was no better way of doing it than by getting an interest in Airco.

The international -- the industrial gas business has moved in the last five, seven years to really being a well competitive situation.

In fact, the single national economy is very rarely these days sufficient to maintain the pace of development and to get the best out of capital resources and technological resources.

And this is why or partly why the world scene is dominated by a handful of international companies.

Now, two of the international competitors with whom we meet at different parts in the world are American companies.

And certainly we saw an advantage in being present in the same market in which our own international competitors are present.

Q What two do you have in mind, sir?

A Air Products and Union Carbide [Linde].

Q All right.

A And lastly, but I don't doubt just as important, is our belief that at the price we were paying for Airco we would get a reasonable return, and in circumstances much better than anything else we could have devised so far as American markets are concerned (Smith 1728-29).

* * * * *

"Q There was reference in one of the documents which you indentified and which was received in evidence, and indeed there was reference in your earlier testimony to BOC's ambition to be ever more international, ever more multi-national.

Did that play a role in this decision?

A Yes.

I don't believe that one can really claim to be a multi-national company without operating in the North American market."
(Smith 1731).

* * * * *

"Q What was the purpose in acquiring the stock in Airco?

A I think as a matter of fact, I have given this in my testimony yesterday, I am very happy to go through it again.

The first reason is that we have always been interested in the industrial gas market in America. While there is no virtue attached to the claim of being an international company, there are nevertheless benefits which can be obtained by being an international company, and quite clearly, those benefits are diminished if we don't have a position in North America."
(Smith 1843-44).

Airco offered BOC the national [U.S.] market in "one jump" (Smith 1736).

106. Peter Laister, a BOC managing director, testified:

> "The next point is that we are an international company but in an international sense we were incomplete. We were not operating in America where three of our international competitors, Air Liquide, Union Carbide and Air Products, for example, operate."
> (Laister 2557).

* * * * *

> "A . . . There were a number of reasons why I personally thought that the tender offer was the right thing to do for BOC and for its shareholders.
>
> First of all, it shows a return upon the investment.
>
> Secondly, it adds to the international strength of BOC.
>
> Thirdly, it gives us a place in the American market which we could see no other way of obtaining.
>
> Q In the American industrial gas market?
>
> A In the American industrial gas market.
>
> Fourthly, it gives us the opportunity of benefiting in the longer term and with providing benefit to Airco in terms of some product or technological interchange, but that is for the future.
>
> Lastly, it places us in the same marketplace as our major international competitors.
>
> Q Let's discuss that. Why is that important to you, sir?

A Basically I think because if they operate in America and there is technological or other development or marketing development, then there are opportunities open to them which are not open to us. That is the first point.

Q Such as?

A Well, I don't know. You know, it is a very large marketplace. Certainly the use of liquid nitrogen for freezing has developed in America ahead of the way it has developed in Europe. Those who take part in America will obviously have that technology available to them, so it is all matter like that.

I don't feel that we could pretend to be a fully international company in the long term if we had given no consideration to the possibilities of the American marketplace."
(Laister 2658-59).

107. Although testifying that BOC could not enter the U.S. industrial gases market de novo or by toehold acquisition, Mr. Smith acknowledged that BOC has entered many industrial gases markets throughout the world on a de novo basis; in other countries, very small acquisitions served as a basis for market entry (Smith 1804-07). In Brazil, BOC is starting in the market with a tonnage plant where it does not have any merchant business (Smith 1807).

(e) BOC Documents

108. In 1969 and early 1970, Allan Perham, chairman of the board of Canox, and I. Greenfield, a member of BOC's London marketing research staff, were detailed by BOC to conduct an extensive study of the U.S. industrial gases business. The purpose of the study was two-fold:

"(i) To analyse the present and likely future situation in the American market, and to draw therefrom any lessons and experience which might have application in BOC Group.

"Subsequently,

"(ii) To consider whether there are any identifiable opportunities in USA which BOC might wish to exploit at some future date." (BOC RX 181-C; accord, CX 47A)

Perham and Greenfield conducted such a study of the U.S. industrial gases market, which included interviews and visits with participants in the industrial gases business in this country, collection of much data, and visits to American distributors (CX 44, CX 232). The Perham-Greenfield report was negative on entry at that time by BOC into the industrial gases business in the United States; however, the report noted that this conclusion was not final and that the situation should be subject to periodic review (BOC RX 62B).

Mr. Smith, BOC's chairman, testified (1710):

"Q Now, I would like to ask you, please, sir, following the receipt of the Perham-Greenfield report, what did you do about the US gases field afterward?

"A What we did was to continue to be very interested in what was going on in the American industrial gas market but what the Perham-Greenfield report told us was that it confirmed an existing belief which existed among all of the top management of the BOC Group was that there was no practical way of coming into the American market."

109. In July 1970, the BOC board of directors adopted priorities of investment and a budget for the development of its business through 1973. Contemporaneous BOC board minutes record these priorities and funds allocated for BOC development:

"Following outline approved:

		£ Millions
"1st:	For the UK	28.0
"2nd:	For restoring BOC holdings in existing overseas subsidiaries to minimum 60%	3.1

"3rd:	For expansion of existing overseas subsidiaries	5.0
"4th:	For Europe	10.0
"5th:	For Japan, USA and South America	3.9
		£50.0 millions"

(BOC RX 67A)

The funds allocated to the United States, Japan and South America included no sums for entering the industrial gases market (Smith 1714). Mr. Laister testified, however, that acquisitions are left out of planning documents when it is uncertain what acquisitions will occur in the future (Laister 2569-70). He also testified that:

> "Quite obviously in any large business you can't read the future a few years out". (Laister 2621A).

(f) Feasibility of BOC's Entry

110. It was clearly feasible for BOC to enter the industrial gases market in the United States either de novo or by toehold acquisition (See Smith 1760). Further, there is no evidence which indicates the presence of any unique features in the U.S. market which would preclude entry by BOC in the same manner BOC entered many industrial gases markets around the world which has been accomplished by a de novo or "grass roots" entry, or by the acquisition of a small producer (Smith 1803-07). BOC entered the Canadian industrial gases market de novo after World War II and is now the third largest firm in that market with sales of $8 million (Smith 1759; Dow 2042; Laister 2560). BOC recently entered the Brazilian industrial gases market with a small plant (Smith 1006). The Brazilian market has a growth rate comparable to the U.S. market (Baker 2731). Other major producers have entered foreign markets successfully on a small basis. Air Products successfully entered Great Britain in 1957 as a de novo entrant. By 1973, Air Products held 25 percent of the industrial gases market in Great Britain (Baker 413-17). Air Products recently entered the Canadian market on a very small basis, having less than 1 percent of the market (Baker 2711-15).

111. Liquid Air, Inc. successfully entered the U.S. industrial gases market through the purchases of toehold firms in 1968, 1969, 1972 and 1973 (CX 335V-W; Dempster 528-30). At the time Liquid Air entered the U.S. market, it purchased American Cryogenics from Standard Oil of New Jersey. At that time, American Cryogenics was losing money at the rate of $4 million per year. Liquid Air was able to turn the company around, and with the acquisition of other small industrial gas producers, developed a substantial and profitable U.S. operation (Dempster 518-21, 526-27).

112. BOC could have entered the U.S. industrial gases market in any of several ways. It could have entered by acquiring one or several small producers of industrial gases; it could have entered by bidding on a tonnage plant; it could have added incremental capacity to the tonnage plant for sale in the merchant market; it could have entered into a joint venture as was discussed with Chemetron (See Finding of Fact 102); or it could have utilized any combination of the above. At the time BOC acquired the stock of Airco, there were and still are a number of attractive small U.S. industrial gases producers available for acquisition, including Burdett of Norristown, Northern Gases and Supply, and Alabama Oxygen (Heckel 736; Perkins 788; Kimerling 876; Baker 393, 2734-35, 2750, 2781; Flamm 260).

113. BOC argues that de novo entry would involve a very high cost (BOC PF 247-49). BOC's chairman estimated that de novo entry producing a viable operation--over 5 percent of national sales--would be likely to cost $240 million. This high cost would be coupled with uncertainty as to whether there would be a return on such an investment, and, if so, when such a return would be realized. Another obstacle to entry into the industrial gases business in the United States, according to BOC, is the need for "backup"-- the supply of gas to major customers from alternative sources when the producer's supplying plant is out of service, either for scheduled maintenance or as a result of plant failure (Giordano 1931-32; CX 335Z). BOC also argues that major tonnage supply contracts in the industrial gas industry typically are for terms of 15 years (Baker 2739-40), and that it is not feasible to enter the tonnage end of the industry by soliciting existing customers of the firms in the business already.

114. None of these arguments are persuasive. BOC has entered markets around the world de novo and on a small basis. The record does not establish that it is necessary to immediately secure 5 percent of the national market. As to uncertainty as to whether there would be an adequate return, this is always a concern to any enterprise in a free competitive society. The health of the U.S. industrial gases market as of December 1973, is a strong indication that BOC could have entered the market, with an excellent chance of realizing a normal profit. There is no evidence that backup supplies are not readily available to all industry members (Loveman 585). There is no evidence that backup has caused any company to avoid any market in the world, or to avoid any contract of any kind. Backup may be a competitive obstacle, but it is not a barrier to market entry. As for long term tonnage contracts, BOC's opportunity for market entry is not limited to seeking existing customers under contract; BOC can compete for the new market demands which the record indicates existing firms were unable to satisfy.

115. BOC argues that the small companies which are in the U.S. industrial gases market are either unattractive investments or there is no showing they are available for acquisition (BOC PF 257-314). The record does establish that there are small companies in the industrial gases market and that they are available for acquisition now or would be in the future (Loveman 592; Perkins 788; Heckel 73[illegible], 746-48). The record does not establish whether they would be good investments or bad investments. Such a burden would be unrealistic. The record does establish, however, that Liquid Air entered the U.S. market by acquiring a company in 1968, that was losing $4 million per year. Liquid Air now has a profitable U.S. operation. The industrial gases market was much more attractive in 1973 than in 1968 when Liquid Air entered the market.

116. December 1973 would have been an opportune time for BOC to enter the U.S. industrial gases market either on a "grass roots" basis or through the acquisition and expansion of a small company (Baker 2734-35). BOC's apparent reason for acquiring Airco stock as its method of entry into the U.S. industrial gases market was that it undoubtedly offered BOC a substantial share of the U.S. industrial gases market at "one jump" with

less risk to its investment. As a matter of fact, BOC had been considering purchasing Airco, or Airco's gases division, for several years (CX 37A, CX 40A; Laister 2540-41). It is thus concluded that BOC was an actual potential entrant into the U.S. industrial gases market as of December 1973.

IV. INHALATION ANESTHETIC EQUIPMENT

A. Relevant Product Market

117. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition or to tend to create a monopoly in the manufacture, distribution or sale of inhalation anesthetic equipment, or any submarket thereof, throughout the United States or sections thereof (Complaint, Par. 27). "Inhalation anesthetic equipment" (hereinafter IAE) is defined in the complaint as equipment and accessories used in the administration of gas for anesthetic purposes (Complaint, Par. 1(b)). Dr. John Hedley-Whyte, an anesthesiologist, testified as complaint counsel's expert on IAE (Hedley-Whyte 1189-1294). He defined IAE as that equipment necessary and useful for the giving of inhalation anesthesia to patients (Hedley-Whyte 1196).

118. Complaint counsel issued a subpoena to the leading firms in the industry calling for sales of all IAE products (CX 316B, in camera; Kuehn 1140; Scott 1355-56; Schreiber 1060-63; Hedley-Whyte 1166-67, 1170). This subpoena listed the following products as comprising the IAE market:

(a) Anesthesia machines. The essential elements of an anesthesia machine are a cart and a cabinet which provide a framework for the other equipment, and yokes, regulators, needle valves and flow meters, vaporizers, breathing circuits (conducting tubes), masks, CO_2 absorption cannisters and rebreathing reservior bags (Cosgrove 2286-89, 2295, 2320-21).

(b) Anesthesia vaporizers. These are small metal or glass containers which convert a liquid anesthetic agent into vapor, combine it with a stream of carrier

gas, which is delivered to the patient (Schreiber 1054, Cosgrove 2288).

(c) Rebreathing reservoir bags. There are two general systems used for the administration of inhalation anesthetics: rebreathing and non-rebreathing. In the former, some of the gas administered to the patient is recirculated to the patient again and again after carbon dioxide is first removed from the expired gas. In non-rebreathing systems, all the gas administered to the patient is fresh, and the patient's exhalations are not recirculated to him (Schreiber 1055; Cosgrove 2320; Hedley-Whyte 1200). The rebreathing reservoir bag collects the expired gas from a patient in a rebreathing system. These units retain the moisture in a patient's lungs and mouth (Cosgrove 2320; Schreiber 1055; Hedley-Whyte 1200).

(d) Anesthesia conducting tubes carry the gas from the anesthesia machine to the patient and may be either disposable or reusable. Typically, the reusable tubes are rubber and the disposable tubes are plastic (Cosgrove 2321; Schreiber 1055-56).

(e) Anesthesia airways are small curved tubes that are inserted into the patient's mouth in order to prevent him for biting endotracheal tubes that are inserted into the trachea (Hedley-Whyte 1202).

(f) Anesthesia face masks are used to conduct gas from the anesthesia conducting tube directly to the patient's nose and mouth (Cosgrove 2323-24; Schreiber 1056-57; Hedley-Whyte 1202-03).

(g) Connecting Y-pieces. In rebreathing systems, two conducting tubes lead from the anesthesia machine to the patient. One conducts fresh gas from the machine to th atient and the other carries the exhaled gas back to th chine. The Y-piece is a small rubber fitting that c cts these two conducting tubes to the face mask (Cosgrove 2325; Schreiber 1056-57; Hedley-Whyte 1203).

(h) Adapters and fittings. Y-pieces typically have an inside diameter connection of 15 millimeters while older face masks often have 22 millimeter diameter connections. Adapters are used to connect these older type masks to the 15-millimeter Y-pieces (Schreiber 1057-58).

(i) Carbon dioxide absorption cannisters. In rebreathing systems, it is necessary to remove carbon dioxide from gas exhaled by the patient before recirculating the gas. Hence, anesthesia machines are normally equipped with a plastic and metal cannister which contains a chemical compound, called an absorbant, that absorbs carbon dioxide from the exhaled gas before it is recirculated (Schreiber 1058; Hedley-Whyte 1203-04). The absorption cannister is made from polypropylene plastic and steel castings obtained from ordinary foundries (Cosgrove 2297-98). The absorbants are manufactured by chemical companies (Kuehn 1172-74).

(j) Flow meters are used to control the flow of gas to the patient during anesthesia (Cosgrove 2293-94, 2287).

(k) Carts. Anesthesia carts are used to support drugs and equipment that may be needed in the operating room during an anesthesia procedure (Hedley-Whyte 1204).

(l) Yokes, handscrews and valves are used to maintain the anesthesia machine and attach gas cylinder to the machine (Cosgrove 2292; Schreiber 1059).

(m) Anesthesia ventilators are devices which mechanically assist and control a patient's breathing during anesthesia (Schreiber 1059; Hedley-Whyte 1205-06).

(n) Anesthesia respirometers measure the respiratory minute volume, i.e., the total volume of air breathed in one minute by a breathing patient (Schreiber 1059; Cosgrove 2328-29), and is an indication of the level of anesthesia, i.e., the level of unconsciousness of the patient (Schreiber 1059).

(o) Endotracheal tubes are long tubes inserted into the patient's trachea to keep the patient's airway free. They are connected to the anesthesia machine via the conducting tubes and conduct air or the anesthetic mixture into the patient's respiratory system (Cosgrove 2328; Hedley-Whyte 1206-07; Schreiber 1060).

Complaint counsel's subpoena specifications also included a category entitled "other". Some of the companies responding to complaint counsel's subpoena listed products not specifically mentioned in the specifications under this category. Dr. Hedley-Whyte testified that the items on complaint counsel's subpoena represented a listing of IAE

products and to this listing he would add one other item--direct laryngoscopes. Direct laryngoscopes are small metal devices containing a light which permits the anesthesiologist to view the area behind the patient's tongue in order to facilitate insertion of endotracheal tubes through the voice box (Hedley-Whyte 1207-08). Any other products, according to Dr. Hedley-Whyte, would constitute an exceedingly small part of the overall IAE market (Hedley-Whyte 1197).

119. An anesthesia machine, the most significant product in the IAE market, consists essentially of a cart, cabinet, yokes, needle valves, flow meters, vaporizers, breathing circuits (conducting tubes), masks, CO_2 absorbers and rebreathing reservoir bags (Cosgrove 2285-89, 2295, 2320-21). Ventilators are used in conjunction with an anesthesia machine and may be mounted directly on most anesthesia machines in use today (Cosgrove 2326; Complaint Counsel Physical Exhibit "A"-08). Flow meters are used in both anesthesia and therapy procedures; however, [illegible] flow meters are designed specifically for the [illegible] anesthesia apparatus (Porter 1309; Cosgrove [illegible], and are not normally sold apart from the anesthesia machine (Cosgrove 2326). IAE products each have a very specific function, although there are a few exceptions to this generalization. Reusable and disposable endotracheal tubes are substitutable for one another, as are reusable and disposable face masks and conducting tubes, respectively. Although each product has a specific use, the anesthesia machine and attachments together provide the vehicle for safe inhalation anesthesia during surgical procedures.

120. IAE products have distinct physical characteristics which distinguish them from other types of inhalation equipment and accessories. Inhalation anesthetic equipment and accessories must be semi-conductive to prevent electrocution or explosions (Schreiber 1207-08; Hedley-Whyte 1201, 1205, 1229-30). Due to its necessary semi-conductive property, the price of IAE is substantially higher than the price of inhalation therapy equipment and accessories. Although a few items or IAE can be substituted for items of inhalation therapy equipment and accessories in an emergency situation, the price difference between the two lines make any such substitution economically prohibitive (Hedley-Whyte 1201, 1229).

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121. IAE is recognized by the medical profession and by firms in the industry as a separate and distinct product market. IAE is defined by the medical profession and by firms in the industry as those items utilized in the dispensing of anesthetic gases or the vapors of anesthetic liquids to the lungs of patients to be anesthetized, including surgical, dental, and veterinary anesthetic equipment and accessories (Schreiber 1041; Kuehn 1125; Hedley-Whyte 1196-98; Porter 1297-98). Such products have peculiar characteristics and end uses as they are the only products which are used together to directly administer anesthetic vapors.

122. The Z-79 Committee of the American National Standards Institute recognizes the IAE market as a separate and distinct market. This committee consists of the leading manufacturers of IAE, representatives of the medical professional societies in the United States and representatives of the Federal Government (Hedley-Whyte 1212-13). The Z-79 Committee is primarily concerned with the standards of design, performance and terminology of IAE (Schreiber 1081; Hedley-Whyte 1213). Standards set by the Z-79 Committee apply to surgical and dental inhalation anesthetic equipment and accessories (Hedley-Whyte 1213-14).

123. Dental anesthetic equipment and accessories include nitrous oxide sedation units used in the inhalation of nitrous oxide for purposes of anesthesia. Dental anesthesia refers to the administration by inhalation of anesthesia gases whereby the patient is usually rendered unconscious. In contrast, dental analgesia refers to the administration of a local anesthetic by use of a syringe and needle and merely provides relief from pain rather than rendering the patient unconscious. Only in rare circumstances does nitrous oxide act as an analgesia rather than as an anesthesia (Hedley-Whyte 1197-98, 1246-48; Porter 3/ 1298, 1305, 1331). Nitrous oxide

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3/ Porter's testimony consistently refers to "dental analgesia equipment." Porter's definition of dental analgesia equipment as apparatus used to measure and regulate the flow of oxygen and nitrous oxide to the patient through inhalation rather than intra-venous means corresponds with the definition of dental anesthetic equipment and accessories used by Dr. Hedley-Whyte (1197-98, 1246-47). Therefore, Porter's reference to "dental analgesia equipment" in his testimony apparently refers to dental anesthetic equipment.

sedation units are used for surgical procedures (Porter 1330-31). There is a cross-fertilization between the dental and medical anesthesia professional societies and a dentist may serve on the anesthesia staff of a hospital (Hedley-Whyte 1210). The level of sophistication and technology used in manufacturing dental anesthetic equipment and accessories is the same as that of surgical anesthetic equipment and accessories (Porter 1301, 1331-32).

124. Veterinary inhalation anesthetic equipment and accessories are part of the overall IAE market (Schreiber 1041; Hedley-Whyte 1198). The principles involved in the manufacture and use of veterinary inhalation anesthetic equipment and accessories are the same as those for human inhalation anesthetic equipment (Schreiber 1094-95, 1121-22; Hedley-Whyte 1198). Veterinary anesthesia machines and human anesthesia machines are interchangeable to a degree. Components are sometimes identical (Schreiber 1044-45). Human anesthesia machines are commonly used on animals (Schreiber 1094-95; Hedley-Whyte 1198-99). Ohio Medical Products Division of Airco (Ohio) manufactures both human and veterinary anesthesia machines (Cosgrove 2311).

125. BOC contends that there are other products which should be included in the IAE market. These are products, the sales of which were reported by companies in response to complaint counsel's subpoena under the category "other", and products that were "mentioned" during the hearings (BOC PF 378-379). Complaint counsel have included some of these "other products in their IAE market while not including others (CCRB, Table I). The most significant differences between the parties as to what is in the IAE market is monitoring equipment, which complaint counsel have excluded (CCPF 142).

126. The medical profession does not recognize monitoring equipment as a part of IAE. Monitoring equipment gives feedback on the patient's general condition; i.e., temperature, pulse, blood pressure, heart action, but it is not used a direct measure of the level of anesthesia (Hedley-Whyte 1250, 162; Cosgrove 2478-79). Monitoring devices are used in a limited number of surgical cases (Hedley-Whyte 1286-87). Some such devices are dangerous to use (Hedley-Whyte 1254-58). Ohio regards monitoring equipment as separate and distinct from IAE. Ohio does not manufacture monitoring equipment as it

requires a different technology from that necessary for IAE. Mr. Cosgrove, Executive Vice President of Ohio, testified in regard to monitoring equipment:

> "Judge Barnes: Why don't you make them?
>
> "The Witness: Your honor, our technology lies in another direction. It has for years. It is a case of having to work very hard and spend large sums of money just to bring yourself up to the state of the art and that is being practiced by the other manufacturers."
>
> (Cosgrove 2364)

Different companies manufacture monitoring equipment than manufacture IAE; companies such as Hewlett-Packard and General Electric make monitoring equipment but not IAE (Hedley-Whyte 1262; Cosgrove 2363-64). The same type of monitoring equipment used inside an operating room is also used outside the operating room (Hedley-Whyte 1286; Cosgrove 2480-81); in fact, such equipment's primary usage is outside the operating room (Hedley-Whyte 1251, 1256, 1286-87). Most blood pressure monitoring in surgical procedures is by the same piece of equipment that is used in a doctor's office for routine blood pressure checks (Hedley-Whyte 1259, 1289). Because different departments will be using the same monitoring equipment, hospitals attempt to standardize on the monitoring equipment purchased (Hedley-Whyte 1263). Further, the hospital committee that purchases anesthetic equipment is separate from the committee purchasing monitoring equipment (Cosgrove 2481).

127. IAE is usually sold to the head of the anesthesia department in hospitals (Schreiber 1060), and it is only anesthesiologists and nurse anesthesiologists who work with IAE (Hedley-Whyte 1209-10). IAE products are also purchased by veterinarians and dental anesthetists.

B. Geographic Market

128. The relevant geographic market within which to assess the competitive effects of the BOC stock acquisition in Airco with respect to the IAE market is the United States as a whole. The leading manufacturers of IAE, including Airco and BOC subsidiaries Fraser Sweatman, Inc. and Harris-

Lake, Inc. sell such products throughout the United States (Schreiber 1061; Kuehn 1141; Scott 1355; Cosgrove 2310, 2436-37). There is no dispute as to the geographic market (BOC PF 399).

C. BOC's Operations in IAE

(1) International Operations

129. The Advanced Engineering Division of BOC, formerly the Equipment Division, manufactures and markets IAE (CX 3H, CX 10Z-8, CX 11Z-8). BOC had sold these products in the United States for at least ten years (Cosgrove 2439). During 1973, Medishield Corporation, Ltd., a subsidiary of BOC, consisted of 15 subsidiary companies selling inhalation anesthetic equipment and other medical products throughout the world (CX 292K). During 1973, Medishield Corporation, Ltd., had distributors in over 130 countries (CX 292K). BOC formed Medishield, Inc. to coordinate the activities of its North American medical interests (Smith 1784-85).

(2) Fraser Sweatman, Inc.

130. During 1972, BOC acquired Cyprane, Ltd., a United Kingdom company which manufactured anesthetic equipment, and their wholly owned subsidiaries, Fraser Sweatman, Inc. (hereinafter FS) and Fraser Sweatman, Ltd. of Canada (CX 11L, CX 11Z-8; Smith 1781-82). As a manufacturer and as a distributor for Cyprane, Ltd., FS sold anesthetic equipment in the United States for general medical, dental and veterinary applications (CX 11Z-8). During the period fiscal year 1965 through fiscal year 1973, FS increased its U.S. sales of anesthetic equipment from $604,721 to $2,498,146 (CX 109K). In 1972, FS marketed a wide range of surgical, dental and veterinary inhalation anesthetic equipment and accessories (CX 130-33, CX 135-48). FS has sold vaporizers to Ohio for the last three years (Cosgrove 2307-08).

(3) Harris-Lake, Inc.

131. Harris-Lake, Inc., a U.S. company (hereinafter HL), was incorporated in 1970 (CX 70A, CX 101A). During 1972, BOC owned 24 percent of the Harris Calorific Company,

the parent of HL (Topkis 1153). During November 1972, HL became a manufacturer of anesthesia machines and distributor of respirometers for BOC (CX 51B, CX 94). During November 1973, BOC acquired full control of HL (CX 102D, CX 107). At the time of its acquisition, HL had approximately 3 percent of the U.S. anesthetic equipment market, although its position in Cleveland, Ohio [HL's location], was much greater (CX 101B).

D. Airco's Operations in IAE

132. Ohio is the dominant firm in the U.S. IAE market (CX 169B, in camera; CX 101B). Ohio has been recognized by the industry as the largest manufacturer, in terms of dollars, of IAE in the United States, since at least 1956 (Schreiber 1073, 1088; Kuehn 1156-57; Porter 1316; Cosgrove 2420-21). Ohio's major competitors in the U.S. IAE market in 1973 were Foregger Division of Air Products, Dupaco, and the two BOC subsidiaries, PS and HL (CX 169C, in camera; CX 101B; Schreiber 1073; Kuehn 1156-57; Porter 1315-17).

E. Concentration in the IAE Market

133. The data in the record concerning market shares of the companies in the IAE industry comes from subpoenas served by complaint counsel on 37 companies (CX 314-15, CX 316B, CX 317-31, CX 326, CX 329). The data concerning respondent companies was stipulated (CX 327, CX 330). There is no evidence as to how complaint counsel arrived at the names of the companies to be served with subpoenas. Complaint counsel's subpoena served on the companies called for net sales data by product category for all inhalation anesthetic equipment and accessories including but not limited to the listing of products set forth in the subpoena specifications (CX 316B, in camera; Finding of Fact 118). A category of "other" was also provided in the subpoena. The subpoena also called for data showing all such products manufactured by each company to eliminate the possibility of double reporting of resale products (CX 316B, in camera). The listing of products on the subpoena was stated to be a substantially complete listing of IAE products (Finding of Fact 118).

134. Table I in the confidential section of this Initial Decision contains market share data compiled from subpoena returns and stipulations. This table is basically the same as that proposed by complaint counsel (CCRB, Table I, in camera). Table I data for BOC includes FS and HL sales as well as sales by BOC in the United States through other methods. Table I also includes one-half of BOC respirometers sold in the United States. Respirometers may be used in either inhalation anesthesia or inhalation therapy depending on the attached adaptor (Cosgrove 2493-94). BOC refused to allocate the sales of respirometers between these two markets although North American Draeger was able to do so (Schreiber 1050-52). On Table I, Narco Scientific Industries, Inc. includes Isolette, McKesson and Air Shields; Becton, Dickinson and Company includes Bard Parker; American Hospital Supply Corporation includes Pharmaseal Division; C. R. Bard, Inc. includes Med-Econ Plastics Division; and Sherwood Medical Industries, Inc. includes Aloe Medical.

135. The market share of the four largest manufacturers in the U.S. IAE market in 1972 was 64.5 percent and of the eight largest 87.9 percent (Table I, in camera).

136. The universe figure utilized in Table I is the total of all sales of IAE reported by the 37 companies which were served with subpoenas and respondents' stipulated sales. Complaint counsel did not include insignificant sales reported by the companies of items not in the IAE market. Complaint counsel also solicited testimony from industry executives as to their estimate of the total U.S. IAE market. Mr. Scott, general manager of Foregger, testified that the total IAE market was $30 million within an error range of 15 percent (Scott 1359). He listed 13 companies (Foregger, Ohio, BOC, Dupaco, North American Draeger, National Catheter, Rusch, Porter, Welch Allyn, Anesthesia Associates, Bard Parker, Narco Scientific, Bird), which he identified as accounting for 90 percent of the net U.S. sales, at the manufacturing level plus imports, of IAE (Scott 1356-59). These companies, whose sales figures are reflected on Table I, had aggregated sales of $22.4 million in 1972, which results in an estimated universe figure of $24.9 million. The aggregated sales of all the companies shown on Table I were $24.5 million, or more than 98 percent of the estimated universe. Mr. Schreiber, president of North America Draeger, estimated the total market as $25 million (Schreiber 1072). Mr. Porter,

president of Porter Instrument Company, estimated the total market as $20 million (Porter 1315).

137. BOC contends that the record does not furnish any reliable data from which market shares or industry concentration can be measured (BOC PF 416-447). BOC contends that complaint counsel's subpoena was not directed to all firms manufacturing IAE, that the list of products on the subpoena was not an exhaustive list, and the subpoena specifications were ambiguous. Complaint counsel's expert witness, Dr. Hedley-Whyte, testified that the listing of IAE products on complaint counsel's supboena was substantially complete. Also, complaint counsel's subpoena called for sales data on all IAE equipment to be broken down by product category. A category of "other" was provided to cover IAE products not specifically covered by complaint counsel's listing of products. If all the IAE items reported by companies responding to the subpoenas had been included in Table I, it would represent only an insignificant change in the data actually utilized therein. In fact, such data would only serve to increase the sales of Ohio and Foregger, two of the largest companies in the IAE market, and thus to increase industry concentration.

138. Industry witnesses identified the leading firms in the IAE market. Dr. Hedley-Whyte testified that sales of the principal items of IAE--anesthesia machines--were made by Ohio, Foregger and BOC (Hedley-Whyte 1218). Mr. Schreiber, Mr. Scott, Mr. Porter and Mr. Kuehn, executives of IAE manufacturers, all identified as IAE manufacturers, those companies which were served with subpoenas and whose sales data is shown on Table I (Schreiber 1061-63, 1073; Kuehn 1156-57, 1170; Porter 1311; Scott 1356, 1369-73). BOC estimated that Ohio had 33 percent of the IAE market and Foregger 10-15 percent (CX 101B). By contrast, respondents did not call as witnesses any IAE manufacturers other than Mr. Cosgrove of Ohio. No subpoenas were served on IAE manufacturers by respondents to secure sales data, and only the most general testimony was elicited as to other companies that might have been manufacturers or importers of IAE, what products they manufacture, and their total sales of IAE. Examples of some of this testimony is as follows:

DIRECT EXAMINATION

Kaplan: (BOC counsel) "Have you heard of a vaporizer called Takiocha?

Cosgrove: (Ohio executive) Takiocha is manufactured in Brazil by a Japanese doctor and there are a few of them in the United States which I have seen in use." (Cosgrove 2309).

CROSS EXAMINATION

Nickel: (Complaint Counsel) "You also mentioned a Brazilian firm that you believe imported vaporizers. Do you have any idea of the amount of their sales of vaporizers in the U.S.?

Cosgrove: No.

Nickel: Do you know whether they have sold any in the U.S.?

Cosgrove: I don't know.

Nickel: Have you seen them in hospitals?

Cosgrove: We are talking about a vaporizer now as opposed to a machine. I have never seen a tachio machine in this country and I have never seen a vaporizer either." (Cosgrove 2426)

In another instance, Mr. Cosgrove testified as follows regarding a manufacturer of oxygen analyzers:

Kaplan: "How about Beckman Instruments?

Cosgrove: Very possible.

Kaplan: How about Electrodyn?

Cosgrove: I believe they do.

Kaplan: Now --

Judge Barnes: Mr. Cosgrove, I think you ought to be certain in these answers. If you are not certain -- you just said 'very possibly', and 'I believe they do.' That won't be helpful to me. If you know, say yes.

Kaplan: Specifically, with respect to Electrodym, do you know?

Cosgrove: I don't know." (Cosgrove 2343).

139. The record does reflect that there are some products which possibly should be included in the IAE market and are not reflected on Table I. For example, Air Products (Foregger) reported sales of "alarms, monitors" (CX 317E, in camera). Mr. Scott testified that these products are "oxygen alarms, low pressure alarms that are included on anesthesia machines" (Scott 1375). Thus, these products apparently should have been included in the IAE market. Another product that arguably could be included in the IAE market is CO_2 absorbent material used in surgical anesthesia, although this product is a chemical and differs in this regard from other IAE products. Complaint counsel have included the CO_2 cannisters in the IAE market, but not the absorbent material (Kuehn 1129-30, 113; CX 316A, in camera). The testimony reveals, however, that there are only two manufacturers of this product-- Chemetron and Dewey and Almy [W. R. Grace]. Dewey and Almy is considerably larger in this product category than Chemetron. Dewey and Almy, a chemical company, manufactures the product; it is marketed through Ohio and Puritan-Bennett (Kuehn 1172-74). If oxygen alarms were included in the IAE market, it would increase industry concentration. As for CO_2 absorbent material, inclusion of this product in the IAE market would not make a significant change in concentration figures (CX 329X). Further, a realistic appraisal of this product is that Ohio is a significant factor in its sales and its inclusion in the market would increase market concentration and Ohio's dominance.

140. It is concluded that market data set forth on Table I is sufficiently precise to constitute a basis for measuring concentration in the IAE market.

F. Barriers to Entry

141. Barriers to entry in the manufacture and distribution of IAE in the United States include technological expertise in manufacturing and marketing; sales and service organization; capital; brand loyalty; and, entrenchment of leading companies in this market.

142. Technological expertise, such as engineering capabilities; extensive knowledge and experience in the medical field of anesthesia; administrative expertise; and production knowledge including research and development are necessary for a new company to enter into the manufacturing of IAE (Schreiber 1077-78; Kuehn 1161; Porter 1317).

143. Capital requirements are high for a company to enter the production and distribution of IAE (Schreiber 1076; Kuehn 1161-62; Porter 1318). North American Draeger, a recent entrant into the IAE market, had technical assistance and financial backing from Draeger Werke, A.G., a German firm (Schreiber 1039).

144. A national distribution network is necessary to enter successfully the IAE market. The leading companies all distribute their inhalation anesthetic products either through dealers or by direct sales to hospitals (Schreiber 1060; Kuehn 1141; Scott 1355; Cosgrove 2369). Ohio has over 800 dealers, a number of whom do not carry products which compete with Ohio's IAE products (Cosgrove 2427-29). HL has 108 dealers (CX 101B).

145. A sales force is essential for a new company to enter successfully into this market (Schreiber 1078; Porter 1319). A sales force introduces and demonstrates products through direct sales or by working with a dealer when introducing a new product (Schreiber 1078). Ohio has approximately 73 salesmen selling IAE; HL and FS have a combined total of 10-11 such salesmen (Cosgrove 2427; Laister 2561-62). Companies with a more complete line of products have several advantages over companies with a narrower line of products. Companies with a full line have a lower cost of selling

(Schreiber 1080). Only Ohio, Foregger and BOC have a broad line of IAE products (Kuehn 1170; Hedley-Whyte 1218; Table I, in camera).

146. A service force is necessary for the successful marketing of IAE (Schreiber 1078; Porter 1319-20). Service is one of the major concerns of hospitals when deciding what equipment to buy (Schreiber 1078-79; Hedley-Whyte 1219). Hospitals prefer to sign contracts for service on a regular basis (Schreiber 1079). Ohio has 75 servicemen in their medical service organization (Cosgrove 2428).

147. When a hospital purchases IAE it considers: the reliability of the selling company and its equipment; the selling company's ability to provide good service; and, how the medical profession views the design characteristics of the machine or line of equipment offered by the selling company (Hedley-Whyte 1219). Hospitals tend to train residents on the anesthesia machines they are most likely to encounter in their practice (Hedley-Whyte 1282-83). Medical practitioners tend to continue using the same type of equipment they used during their training (Smith 1792; Cosgrove 2439). The three most common anesthesia machines are manufactured by Ohio, Foregger and BOC (Hedley-Whyte 1268-70; 1282-83).

148. For a new firm to successfully enter the IAE market it is essential to develop a reputation which reflects the image of the company, the quality of the product and service (Schreiber 1079; Cosgrove 2431). At least one smaller manufacturer of IAE, Porter Instrument Company, contemplated marketing directly its own equipment and concluded that it did not have the resources, capital, and sales and service personnel to do so (Porter 1319).

149. The entrenchment of the major companies offering a broad line of equipment in the IAE market constitutes the major barrier facing a new entrant into this market. Mr. Kuehn, a former executive of Chemetron, testified:

> "The main barrier would be the establishment, the firm establishment of the major companies involved in this particular product area today."
> (Kuehn 1162)

Dr. Hedley-Whyte testified that anesthesiologists are inherently conservative; they get used to a certain design, a history of reliability of a given machine and service provided by a given company (Hedley-Whyte 1219). This knowledge led Dr. Hedley-Whyte to advise at least two companies against entering the IAE market (Hedley-Whyte 1224-25). Ohio has been the dominant firm in IAE since at least 1956 (Schreiber 1088; Kuehn 1156-57; Porter 1316; Cosgrove 2420-21).

G. Anticompetitive Effects of Airco Acquisition in IAE Market

150. Prior to the acquisition of Airco, BOC competed with Airco for sales in the IAE market (CX 135-48; Complaint Counsel Physical Exhibit "A"; Table I, in camera). Ohio's medical products are "identical or closely parallel to those of BOC" (CX 76B, in camera). BOC's stock acquisition in Airco eliminated that competition.

151. Prior to the acquisition, Airco anticipated that FS, with the backing of BOC, would challenge Airco's position in the IAE market (CX 169C, in camera; Cosgrove 2510-11). If BOC had not acquired Airco, BOC would have expanded its IAE operations in the United States (Smith 1788; Cosgrove 2510-11). This combination of BOC and Airco eliminates any possibility of BOC challenging Airco's dominance of the IAE market.

152. The acquisition of Airco by BOC has enhanced the dominant position of Airco in the manufacture of IAE by raising Ohio's market share significantly (Table I, in camera).

153. The acquisition of Airco by BOC raised the already high barriers to entry for any firm wishing to enter the U.S. IAE market (Kuehn 1162, 1166).

V. INHALATION THERAPY EQUIPMENT

A. Relevant Product Market

154. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition and to tend to create a monopoly in

the manufacture, distribution or sale of inhalation therapy equipment, or any submarket thereof, throughout the United States or sections thereof (Complaint, Par. 27). "Inhalation therapy equipment" (hereinafter ITE) is defined in the complaint as equipment and accessories used in the administration of gas for therapeutic purposes (Complaint, Par. 1(c)). Dr. Ronald John Karpick, a physician specializing in pulmonary medicine, testified as an expert witness for complaint counsel (Karpick 1381-1432), and he defined ITE as:

> "Inhalation therapy equipment would have to involve all of the machinery which is involved with administering the respiratory therapy, as I like to call it rather than inhalation therapy services. This involves everything from the simple nasal catheter for administration of oxygen straight through to the large complicated machinery needed for constant volume ventilation of patients who are otherwise unable to ventilate themselves." (Karpick 1387.)

155. Complaint counsel's subpoena (CX 316B-C), previously discussed in connection with the IAE market, also requested sales data on ITE from the same 37 companies. This subpoena called for data on all ITE, including but not limited to the following products which were separately listed on the subpoena:

(a) Ventilators and respirators. For practical purposes, the terms "ventilators" and "respirators" are synonymous (Karpick 1389). Both assist a patient in breathing by administering a gas, usually oxygen or air, to the patient under positive pressure; in effect, they force the gas into the patient's lungs (Matsch 1523-25, 1521; Karpick 1386-88).

(b) Humidifiers and nebulizers are devices which vaporize water or convert it into fine particles in order to humidify air or oxygen administered to the patient and prevent the airways from becoming dried out.

(c) Resuscitators. A resuscitator is an emergency device used for the immediate establishment of a breathing pattern in a person who has stopped breathing (Karpick 1930).

(d) Inhalation therapy delivery tubing is used for the administration of gases for therapeutic purposes (Karpick 1390; CX A, form 1764, pp. 5-6).

(e) Inhalation therapy face masks conduct gases to a patient's nose and mouth and exclude room air (Karpick 1390-91; CX A, form 1764, pp. 2-3).

(f) Inhalation therapy flow meters are used to control the rate of flow of gases to the patients (Karpick 1391; CX A, form 1766).

(g) Nasopharyngeal catheters and cannulae are used to convey gases into the patient's nose or nasal passages (Karpick 1391).

(h) Oropharyngeal airways are tubes inserted through the mouth and into the pharynx in order to conduct oxygen or compressed air into the airways and to prevent the patient's tongue from obstructing the airways (Karpick 1391).

(i) Inhalation therapy drain and condensation bottles are bottles attached to ventilators to collect excess humidity from the gas administered to the patient (Karpick 1391).

(j) Adaptors and fittings. These are self-explanatory.

(k) Yokes, hardscrews and valves were described by complaint counsel's expert as "the nuts and bolts . . . that help get all of this together." (Karpick 1392).

(l) Respirometers are used to measure the air breathed by patients (Schreiber 1059). Respirometers can be used either for inhalation anesthesia or inhalation therapy with appropiate adaptors (Cosgrove 2493-94).

(m) Bacteria filters are employed in ventilators and respirators to remove bacteria from the air or oxygen administered to the patient (Karpick 1392).

(n) Tracheotomy tubes are placed in a surgical incision into the trachea in the lower part of the neck to permit easy access to the airways for the administration of ventilation and for intratracheal suctioning. They are used primarily by patients requiring long-term assistance (Karpick 1392).

(o) Incubators are used in controlling and in assisting pediatric patients in breathing (Karpick 1392). Complaint counsel's subpoena also included a category entitled "other." Some of the companies listed products not specifically mentioned in the subpoena specifications under this category. Dr. Karpick testified that he would add oxygen tents and mist tents to the above products (Karpick 1392-93), but that otherwise the product listing was adequate (Karpick 1393). Complaint counsel have also added IPPB (Intermittent positive pressure breathing devices) to the ITE market (CCPF 184). IPPB devices are machines that administer pressure to the upper airways in order to assist patients in breathing (Karpick 1423).

156. Over the years, the medical profession has begun to recognize respiratory therapy or respiratory care as a separate speciality (Karpick 1385-86, 1393-95, 1429-31; Cosgrove 2478-88). Most hospitals which provide major patient care have respiratory therapy departments (Karpick 1386). There are now respiratory therapy specialists who have specialized training and who assist physicians in administering respiratory therapy (Karpick 1393-97).

157. Professional recognition of respiratory therapy, however, is not equivalent to recognition of inhalation therapy as a separate entity. For example, complaint counsel's expert, Dr. Karpick, in explaining why these paraprofessionals had changed their titles from inhalation therapists to respiratory therapists, testified:

> "[I]t became obvious to everyone that inhalation therapy was not the proper term for this group of individuals in that they were dealing more than just with inhalation of various gases and humidity, but they are really responsible for the entire respiratory function of the patient. This does involve intra-tracheal suctioning of the patient, physical therapy, physical rehabilitation; and they are getting involved in the pulmonary function laboratories now." (Karpick 1396. See also Cosgrove 2373-74; Schreiber 1089-90).

Dr. Karpick testified that respiratory therapy is related to the entire respiratory function of the patient, and that inhalation therapy is one method of administering respiratory therapy, with no medical personnel specializing in it (Karpick 1396, 1404, 1407, 1416, 1430-31). Inhalation therapy is a subsection of respiratory therapy and it deals with the inhalation of various gases and the humidification of those gases for therapeutic purposes (Karpick 1396). Inhalation therapy is a distinct method of treating respiratory deficiencies (Karpick 1407).

158. Inhalation therapy includes the modalities of oxygen, carbon dioxide and helium, as well as the use of aerosols and nebulizers to provide humidity to the airways (Karpick 1387, 1404). Complaint counsel contend that inhalation therapy does not include the administration of medications by the use of a nebulizer; the use of suctioning apparatus; the administration of physical therapy and physical rehabilitation; and the use of pulmonary function laboratories. Suction equipment is not part of the ITE market as such equipment is not used for the therapeutic administration of gas. Further, it is widely used in other areas of the hospitals and for purposes other than respiratory therapy (Karpick 1398, 1407, 1426-27). Pulmonary function equipment is a series of products which analyze the lung function to determine the impairment of the lungs or the patient's ability to properly exchange gases in the lungs (Cosgrove 2384). This type of equipment is marketed towards a specific group of physicians interested in diagnostic respiratory products and is not necessarily shown at the same meetings or advertised in the same media as ITE. Such equipment is not used for the therapeutic administration of gases and therefore is not a part of ITE (Cosgrove 2383-85). Complaint counsel's contentions that the administration of medication by use of nebulizers is not inhalation therapy is not logical. Where drugs are administered in connection with a gas, other than the ordinary atmosphere, it is considered part of inhalation therapy (Karpick 1409, 1415). Furthermore, the administration of medications by the use of nebulizers is part of respiratory therapy (Karpick 1404). Therefore, nebulizers are part of the ITE market since they are used to administer drugs by the same process as with the administration of gases. The Riker Medihalor, and similar products, are hand bulb nebulizers which deliver nebulized medication to the patient without employing an accompanying gas other than the atmosphere (Karpick 1410-13; Cosgrove 2378-79).

The hand bulb nebulizers are primarily over-the-counter items (Karpick 1387), are rarely used by physicians, although occasionally prescribed for home use by patients (Karpick 1410-13). These products can be distinguished from the ITE market on this latter basis rather than for the reasons advanced by complaint counsel (CCPF 186).

159. The gases administered for inhalation therapy purposes, oxygen, carbon dioxide, helium and compressed air, differ from those used for anesthetic purposes, such as nitrous oxide (Karpick 1387, 1421). Respiratory therapy and anesthesiology are distinct and separate areas in medicine (Karpick 1430). Presently, anesthesiologists generally do not receive specialized training in respiratory therapy (Karpick 1430). There is a growing trend for pulmonary physicians to head up respiratory therapy departments separate from the anesthesiology departments (Karpick 1385, 1428-30). There is a similar trend for ITE to be purchased by the respiratory therapy department under the direction of a pulmonary physician rather than anesthesiologist (Hedley-Whyte 1271; Karpick 1429-30). The respiratory therapist is the person who actually administers inhalation therapy to a patient. Therapists work with and are under the supervision of physicians (Hedley-Whyte 1210-11; Karpick 1393-94, 1417). Respiratory therapists have minimal access to anesthetic equipment in most anesthesiology departments, even in hospitals where they are under the anesthesiology department (Hedley-Whyte 1211). Advertising of ITE is aimed at different medical personnel and toward an area of medicine separate from anesthesiology (Schreiber 1090). Respiratory therapists have their own professional journals (Karpick 1395). Accordingly, ITE is a separate product market from IAE for purposes of this proceeding.

B. Geographic Market

160. The relevant geographic market within which to assess the competitive effects of the BOC stock acquisition of Airco with respect to ITE is the United States as a whole. The leading ITE manufacturers, including Airco and BOC, sell such products throughout the United States (Fegan 1439; Mausch 1493; McWhinnie 1538; Cosgrove 2497). There is no dispute as to the geographic market (BOC PF 399).

C. BOC's Operations in ITE

(1) International Operations

161. The Advanced Engineering Division of BOC manufactures and markets ITE throughout the world including the United States (CX 3H, CX 6F, CX 10Z-8, CX 11L, CX 11Z-8). Since at least 1968, BOC has sold directly a small volume of ITE in the United States, including oxygen therapy apparatus, resuscitation equipment and Wright respirometers (CX 6F, CX 328, in camera).

162. HL, subsequently acquired in toto by BOC, was a small factor in the U.S. ITE market selling essentially the BOC Wright respirometer (Table II, in camera).

163. Since 1968, BOC has sought to expand its position in the U.S. ITE market and has considered acquiring several U.S. firms (CX 274, 276, 278). During May 1969, David Morgan, planning manager for BOC Medical Products, concluded after visiting the United States that the ITE market was the most obvious and immediately profitable area for exploitation in the United States by BOC (CX 26D). Further, Mr. Morgan concluded that HL could easily be expanded into the ITE market (CX 26D). During 1972 and subsequently, BOC actively explored expanding its operations in the ITE market in the United States and had contacts with several medical companies engaged in the manufacture and sale of inhalation therapy equipment and accessories (Kuehn 1152-53).

164. From 1972 to 1973, BOC through its representative, Mr. Fraser Sweatman, had a series of contacts with Oxequip Health Industries for the purpose of possible acquisition of Oxequip (McWhinnie 1545-55). Oxequip is a manufacturer of ITE (Table II, in camera). During this period, Oxequip was visited by several representatives of BOC, including Mr. Sweatman, A. I. Ray, and a chartered accountant (McWhinnie 1547-49, 1552). The accountant spent an entire day studying confidential financial records of Oxequip (McWhinnie 1552-53).

165. In October 1973, William C. Moeller, president of FS, communicated with Frank Fegan, president of OEM Medical, concerning possible acquisition of OEM by BOC (Fegan 1439-40). OEM is a manufacturer of ITE (Table II, in camera). As a result of this meeting, financial information concerning OEM was sent to Moeller (Fegan 1441).

Further discussions were postponed until early 1974, when Fegan was told that BOC was no longer interested in acquiring OEM (Fegan, CX 294; 144). By this time BOC had already acquired a 35 percent interest in Airco including the Ohio Medical Products Division (Finding of Fact 31).

D. Airco's Operations in ITE

166. Ohio manufactures and markets a line of ITE products, including mist tents, nebulizers and humidifiers, masks, catheters, tubes and airways, resuscitators and IPPB devices, and flow meters (CX Physical Exhibit A; Table II, in camera). Ohio was mentioned by industry witnesses as being a principal competitor in respiratory care equipment (Matsch 1494, 1530; McWhinnie 1539). Ohio has been attempting to expand its share of the ITE market (Cosgrove 2511-12; CX 1690, in camera).

E. Concentration in the ITE Market

167 The data in the record concerning market shares of the companies in the ITE industry comes from subpoenas served by complaint counsel on 37 companies (See CX 316C, in camera). Data concerning respondent companies was stipulated (CX 326, CX 329). There is no evidence as to how complaint counsel arrived at the names of the companies to be served with subpoenas. Complaint counsel's subpoena served on the companies called for net sales data by product category for all inhalation therapy equipment and accessories including but not limited to the listing of products set forth in the subpoena specifications (CX 316C, in camera). A category of "other" was also provided in the subpoena specifications (Finding of Fact 155). The subpoena also called for data showing all products manufactured by each company to eliminate the possibility of reporting resale products (CX 316C, in camera). The list of products on the subpoena were stated to be a substantially complete listing of ITE products (Karpick 1392-93).

168. Table II in the confidential section of this Initial Decision contains market share data compiled from subpoena returns and stipulations. This table is substantially identical to that proposed by complaint counsel (CCRB, Table II, in camera). Table II data includes sales by BOC directly and through its subsidiaries FS and HL [it

appears FS had no sales of ITE in 1972]. On Table II, Narco Scientific Industries, Inc. includes Isolette, McKesson and Air Shields; Becton, Dickinson and Company includes Bard Parker; Air Products and Chemicals, Inc. includes Foregger; American Hospital Supply Corporation includes Pharmaseal; Sherwood Medical Industries, Inc. includes Aloe Medical; and C. R. Bard, Inc. includes Med-Econ Plastics Division. Smith & Wesson Electronics was formerly the Stephenson Company. Table II also includes one-half of BOC respirometers sold in the United States. Respirometers may be used in either inhalation therapy or inhalation anesthesia depending on the attached adaptor (Cosgrove 2493,94).

169. The market share of the four largest manufacturers in the U.S. ITE market in 1972 was 61.4 percent and of the eight largest, 77.7 percent (Table II, in camera). The universe figure utilized in Table II is the total of all sales reported by the 37 companies which were served with subpoenas and respondents' stipulated sales. Table II does not include certain items reported by the companies, which items complaint counsel contend are not in the ITE market.

170. Complaint counsel also solicited testimony from industry witnesses as to the names of their principal competitors and their estimates of the total U.S. ITE market (Schreiber 1061-62; Scott 1356, 1369-73; Matsch 1494, 1530; McWhinnie 1539). Mr. Matsch, an official of Monahan Company, testified that his four largest competitors were Puritan-Bennett, Ohio, Bird and Air Shields (Narco); he estimated the total ITE market at $75 million (Matsch 1494, 1497). Mr. Cosgrove, Ohio's chief executive officer, also estimated the total U.S. ITE market at $75 million (2498-99). Both officials did not include certain insignificant items of ITE in their estimates.

171. BOC contends that the record does not furnish any reliable data from which market shares or industry concentration can be measured (BOC PF 451-476). BOC contends that complaint counsel's subpoena was not directed to all firms manufacturing ITE, that the list of products on the subpoena was not an exhaustive list, and the subpoena specifications were ambiguous. In this regard, complaint counsel's expert witness, Dr. Karpick, testified that the list of ITE products on complaint counsel's subpoena was substantially complete (Karpick 1393). Also complaint

counsel's subpoena called for sales data on all ITE equipment to be broken down by product category. A category of "other" was provided to cover ITE products not specifically covered by complaint counsel's listing. For example, IPPB devices were not listed as a separate category on the subpoena (see BOC FF 454). However, several companies reported sales of IPPB devices, and these sales have been included in Table II.

172. Complaint counsel did not include sales data for several products which were reported pursuant to the subpoenas. These products, such as diagnostic products, compressors, emergency oxygen, monitors, are not in the ITE market. However, if all sales of such products had been included in Table II, it would not change the overall data to any signficant degree. In fact, the most substantial omitted data was for such companies as Ohio, Narco, Puritan-Bennett, and Hudson Oxygen. Inclusion of this data in Table II would only serve to increase market concentration.

173. The principal products in the ITE market are ventilators, respirators, resuscitators, humidifiers and nebulizers. The leading manufacturers of these products are identified in the record (Finding of Fact 170), and their sales data appears on Table II. By contrast, respondents did not call as witnesses any manufacturers of ITE other than Mr. Cosgrove of Ohio. No subpoenas were served on ITE manufacturers by respondents to obtain sales data. Respondents have offered only the most general testimony regarding other companies that might have been manufacturers or importers of ITE, what products they manufacture, and their volume of sales of ITE.

174. Market data on the ITE market is not as clear or convincing as with the IAE market; primarily lacking is data relating to the ITE universe. However, even assuming that the total ITE market is $75 million, which is undoubtedly an exaggerated universe based on this record, four-firm concentration would be 45 percent and eight-firm concentration 57 percent. Further, Table II clearly establishes that under either criteria the market is concentrated and Ohio is one of the leading firms in the market. Accordingly, it is concluded that the market data set forth on Table II is sufficiently precise to constitute a basis for measuring concentration in the ITE market.

F. Barriers to Entry

175. A high degree of technology is necessary for a company to enter into the manufacture and distribution of ITE in the United States (Matsch 1501; McWhinnie 1540). A company would need people skilled in many disciplines including mechanics, rubber, plastics, mechanical and bio-engineering (Matsch 1501). Substantial capital requirements are necessary for a company to enter into the manufacture and distribution of ITE or to expand a product line (Matsch 1499-1500; McWhinnie 1540-41).

176. Before an ITE product can be successfully marketed, it is necessary to have a good clinical evaluation of the item demonstrating its quality and acceptance by the medical profession (Matsch 1501-02). Ohio has a good working relationship with the medical profession including people who will provide clinical evaluation of new ITE products for Ohio (Cosgrove 2410-13).

177. A distribution network is also necessary to enter the ITE market (Matsch 1501-02). The leading companies all distribute their ITE products nationwide through dealers or by direct sales (Cosgrove 2407; Scott 1355; Fegan 1439; Matsch 1493). Ohio has over 300 dealers for ITE, a number of whom do not carry products which compete with Ohio's ITE products (Cosgrove 2427-29). Highly trained, technical sales personnel are important to a company in the U.S. ITE market since they make the initial contact with the hospital's purchasing department representative (Karpick 1384; Cosgrove 2409, 2427-28). Ohio has approximately 73 salesmen handling its ITE products (Cosgrove 2427-28). A highly trained service force is necessary for the successful marketing of ITE (Matsch 1501-02). Ohio has 75 men to service their ITE (Cosgrove 2428).

178. The ability to deliver the apparatus requested, the ability to service the product and the ability to maintain the product, including replacement parts, are all major factors taken into account by the purchasing department of hospitals in buying ITE (Karpick 1385). For a new firm to successfully enter the ITE market, it is essential to develop a reputation which reflects the quality of the product and the image of the company (Matsch 1501-02; Cosgrove 2431). The same requirements for a company to enter the ITE market would also be required for a company in the market to expand its product line (McWhinnie 1541).

BOC possessed the resources and expertise necessary to expand in the U.S. ITE market (Matsch 1502-03).

G. Anticompetitive Effects of Airco Acquisition in ITE Market

(1) Elimination of Competition

179. Prior to BOC's stock acquisition in Airco, BOC competed to a small extent with Airco for sales in the U.S. ITE market (CX 328, in camera; CX 150C, Z-20-21; Commission Physical Exhibit "A"-F-F, H-6; Table II, in camera). This acquisition eliminated actual competition between the two companies.

180. BOC, in 1973, had the technical and marketing expertise necessary to expand its small U.S. operations in the ITE market (Matsch 1502). BOC had the capital resources required for expansion (Topkis 1503). BOC is extensively engaged in marketing medical products in 60 countries throughout the world (Smith 1790), including ITE (Smith 1791). But for the acquisition, BOC would have expanded its manufacturing and marketing operations in the United States in its attempts to become one of the leading companies in the U.S. ITE market (Smith 1788). BOC had considered acquiring small U.S. firms engaged in the ITE market (Finding of Fact 163), and the ITE market appeared to BOC to be the most obvious and profitable area in the U.S. medical market for exploitation by BOC (Findings of Fact 163-165). The combination of BOC and Airco eliminated any possibility of increased competition between BOC and Airco.

181. The acquisition of Airco by BOC strengthened the market position of Airco in the ITE market by increasing Ohio's market share (Table II, in camera).

(2) Heightened Barriers to Entry

182. The acquisition of Airco by BOC raised the already high barriers to entry for any firm wishing to enter the U.S. ITE market or to expand its product line (Kuehn 1106; Findings of Fact 175-178).

CONCLUSIONS

I. INDUSTRIAL GASES

A. The Industrial Gases Industry Comprises a Line of Commerce

It is well settled that an entire industry may constitute a line of commerce within the meaning of Section 7 of the Clayton Act. United States v. Phillipsburg National Bank & Trust Co., 399 U.S. 350 (1970); United States v. Philadelphia National Bank, 374 U.S. 321 (1963); A.G. Spalding & Bros., Inc., 56 F.T.C. 1125 (1960), aff'd, 301 F.2d 585 (3rd Cir. 1962); United States v. Bethlehem Steel Corp., 168 F. Supp. 576 (S.D.N.Y. 1958).

The United States Supreme Court held that the relevant line of commerce in which to appraise the probable competitive effects of a proposed merger in Philadelphia National Bank, supra, was

> "...the cluster of products (various kinds of credit) and services (such as checking accounts and trust administration) denoted by the term 'commercial banking.'...composes a distinct line of commerce." (374 U.S. at 356).

Commercial banking was found by the Supreme Court to be a distinct line of commerce even though the various services and products offered by commercial banks are distinguishable from each other and in some instances are also provided by financial institutions other than commercial banks. The Court emphasized that it was the cluster of products and services that commercial banks offered that as a matter of trade reality made commercial banking a distinct line of commerce. The Supreme Court later reaffirmed its holding that the commercial banking industry as a whole was a relevant line of commerce for Section 7 purposes. Phillipsburg National Bank, supra, 399 U.S. at 359-62.

The Commission has similarly held an entire industry to constitute a relevant line of commerce. A.G. Spalding & Bros., Inc., supra, 56 F.T.C. at 1160. In determining the relevant line of commerce within which to measure the

the impact of a merger between Spalding and Rawlings Manufacturing Company, the Commission ruled:

> "Counsel supporting the complaint also contends that the athletic goods industry as a whole constitutes a line of commerce within the meaning of Section 7 of the Clayton Act. We believe the record fully supports this contention. The testimony of AGMA [Athletic Goods Manufacturing Association] officials establishes that the principal products of this industry are those listed in the AGMA Census Reports. These products are manufactured and sold by Spalding and formerly had been manufactured and sold by Rawlings. They are products which are required to be used in established and well-organized athletic games. They have peculair characteristics and end-uses for which there are no substitutes; they are distinct from the products of other industries; and are sold in a recognized market with its own competitive standards. See United States v. Bethlehem Steel Corporation, 168 F. Supp. 576 (1958). Moreover, the athletic goods industry is recognized by its members and by its trade association as a separate and distinct industry. It is our opinion, therefore, that the industry itself is a relevant market within which to measure the impact of the merger." (56 F.T.C. at 1160).

On appeal, Spalding argued that a line of commerce may consist of only competitive indistinguishable products and therefore various athletic products such as baseballs, baseball gloves and mitts, footballs, and basketballs could not constitute a market. The Third Circuit Court of Appeals rejected Spalding's argument and held that the Commission, for the reasons set forth in its opinion, had "properly determined that the athletic goods industry as a whole is a relevant market within which to measure the impact of the merger." A.G. Spalding & Bros., Inc., 301 F.2d at 506.

In United States v. Bethlehem Steel Corp., supra, the District Court for the Southern District of New York held that the sum of all products of the iron and steel industry constituted a line of commerce within the meaning of Section 7. The basis for the District Court's conclusion was as follows:

> "The products of the iron and steel industry as a group are generally standardized, are not subject to the vagaries of style appeal, and have peculiar characteristics and uses for which there are no effective substitutes. The manufacture of such products requires special know-how and experience, huge capital investment and a trained labor force. The products of the iron and steel industry are generally distinct one from the other and as a group distinct from the products of other industries. They are sold in a recognized market with its own competitive standards. The iron and steel industry is commonly recognized by its members as well as the community at large as a separate industry. It has its own trade asscciation, treating the industry as separate and distinct. In the light of these facts the conclusion is warranted that the sum of all the products of the iron and steel industry constitute a line of commerce. Since Bethlehem and Youngstown both produce and sell the principal products of the iron and steel industry, it is an appropriate line of commerce for analyzing the effect of this merger." (168 F. Supp. at 593-94).

The evidence of record in this present proceeding clearly establishes that the industrial gases industry as a whole constitutes a relevant line of commerce within which to measure the impact of BOC's stock acquisition in Airco. The industrial gases industry is recognized by its members and two trade associations as a separate and distinct industry. Industrial gases companies only recognize other industrial gases companies as their competitors. The Bureau of the Census has classified the production and marketing of industrial gases as a separate economic entity since at least 1945. Further, the Bureau of the Census and members of the industry

generally define the same group of gases as industrial gases. Industrial gases companies generally market the same group of gases, although some companies market insignificant volumes of gases not marketed by others. Both Airco and BOC market a wide range of industrial gases. Further, customers for industrial gases can look only to industrial gases companies for their needs.

There is also a commonality of technical expertise and capabilities involved in the production, transportation and marketing of the various industrial gases. Unique production and marketing facilities are utilized. Further, industrial gases have unique characteristics and end-uses, and, accordingly, are distinct from and do not compete with the products of other industries.

Respondents argue that only products which are completely interchangeable may constitute a relevant line of commerce, and that industrial gases are generally not substitutable for each other (BOC PF* 214-228). Respondents' position is based upon the Supreme Court's statement in Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962), that

> "The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it." (Footnote omitted.)

The Supreme Court clearly did not intend to preclude an economically significant group of noninterchangeable products from being defined as a relevant line of commerce. In Philadelphia National Bank, supra, and Phillipsburg National Bank, supra, both decided after Brown Shoe, the Supreme Court held that the cluster of products and services offered by commercial banks constituted a relevant line of commerce. The products and services of commercial banks such as personal loans, checking accounts, estate and trust planning, and safety deposit boxes are clearly not interchangeable.

Moreover, the Supreme Court has made it abundantly clear that "...submarkets are not a basis for the disregard of a broader line of commerce that has economic significance." Phillipsburg National Bank, supra, 399 U.S. at 360. In the

present case, it would be inappropriate to divide industrial gases into submarkets for the purpose of assessing the competitive impact of BOC's stock acquisition in Airco. Both BOC and Airco market a wide range of industrial gases and there is no evidence in the record which suggests that BOC intended to enter the U.S. industrial gases market with less than a broad line of industrial gases. There is no evidence of record that any industrial gases company markets only a single industrial gas; all companies market a broad line of industrial gases. Industrial gases customers normally use a wide range of industrial gases. Further, the evidence of record firmly establishes that the industrial gases market is "sufficiently inclusive to be meaningful in terms of trade realities." Crown Zellerbach Corp. v. FTC, 296 F.2d 800, 811 (9th Cir. 1961).

B. Industrial Gases Geographic Market

Section 7 of the Clayton Act, as amended, prohibits an acquisition if its effect may be substantially to lessen competition in any line of commerce in "any section of the country." The United States Supreme Court has recently reiterated the proper test for determining the relevant "section of the country" within which to measure the competitive impact of an acquisition:

> "Without exception the Court has treated 'section of the country' and 'relevant geographic market' as identical, and it has defined the latter concept as the area in which the goods or services at issue are marketed to a significant degree by the acquired firm." (United States v. Marine Bancorporation, Inc., 42 U.S.L.W. 5210, 5215 (June 26, 1974)).

Airco, the acquired firm in the present case, produces and markets industrial gases throughout the United States. Further, Airco bids for both tonnage and merchant accounts nationwide. BOC, the acquiring firm, was interested in participating in the United States market on a national basis. The nationwide scope of Airco's industrial gases operation was one of the primary reasons for BOC acquiring stock in Airco.

Therefore, considering the area where Airco operates as well as the area where BOC intended to enter, the nation as a whole is the geographic market within which the effect of BOC's acquisition should be measured. Further, the other large U.S. industrial gases companies produce and market industrial gases throughout the United States and, like Airco, bid for new accounts nationwide. Accordingly, BOC's acquisition of stock interest in Airco will affect competition in the industrial gases industry throughout the entire United States.

Respondents contend the competitive impact of BOC's acquisition must be considered on a regional basis because some industrial gases cannot be shipped economically more than 100 to 300 miles. Such a contention, however, ignores the fact that the large industrial gases companies, in fact, compete throughout the entire United States. This is accomplished by having plants strategically located throughout the United States.

Respondents' argument is also contrary to the Commission's holding in Kennecott Copper Corp., 78 F.T.C. 744 (1971), aff'd, 467 F.2d 67 (10th Cir. 1972), cert. denied, 94 S. Ct. 1017 (1974). Kennecott Copper, which is squarely on point with this issue, was a potential competition case involving the coal industry. Coal, like some industrial gases, can only be economically shipped limited distances, and coal marketing is therefore generally confined to the geographic area of its production.

The Commission held in Kennecott Copper that although the distance over which coal is shipped is limited, the nation as a whole constituted the relevant geographic market within which to assess the impact of the challenged acquisition. The Commission based its conclusion on the fact that the large coal companies, including the acquired company, compete with each other throughout the United States and the fact that the acquiring company intended to become a nationwide competitor. The geographic market issue was raised on appeal to the United States Court of Appeals for the Tenth Circuit. The Tenth Circuit upheld the Commission's determination that the nation as a whole was a relevant geographic market. 467 F.2d at 71. That same conclusion must be reached in this proceeding. 4/

4/ The Commission's holding in Kennecott is not inconsistent

C. Market Concentration

The industrial gases market in the United States is highly concentrated. BOC respondents do not dispute that the top seven or eight firms account for the bulk of the market. The evidence of record establishes that in 1972, the top eight industrial gases firms in the United States accounted for 86.5 percent of the market and the top four firms held 69.6 percent of the market. 5/ Top eight firm concentration in the industrial gases market has increased from 84 percent to 86.5 percent during the past five years and the top four firm concentration has increased from 67 percent to 70 percent. Further, the record discloses a significant increase in industry concentration from 1967 to 1972 through mergers (Findings of Fact 65-66). 6/

The degree of concentration in the U.S. industrial gases industry is well above the level considered by the Commission and the federal courts to constitute a

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with the Supreme Court's decision in United States v. General Dynamics Corp., 42 U.S.L.W. 4368 (see BOC RB 51). In General Dynamics, the Court expressly did not reach geographic or product market; further Kennecott was affirmed by the Court subsequent to the General Dynamics decision.

5/ These concentration figures are based upon the total value of shipments by primary producers of industrial gases. These concentration ratios are an accurate reflection of industry concentration since it is to the industrial gases companies which customers must look to supply their needs. Concentration ratios based upon value of shipments of industrial gases of all manufacturers including those not in the industrial gases industry are also extremely high, with the top eight and four firms accounting for 79.3 and 63.8 percent respectively of total value of shipments in 1972 (Findings of Fact 62-64).

6/ Other evidence of industry concentration in industrial gases exists. There are only three "national bulk producers" in the industrial gases market -- Linde, Air Products and Airco. It is basically these three companies that purchasers of industrial gases have to look to fill the shortages of industrial gases which existed as of 1973 (Dempster 559; Smith 1732-33; CX 95D).

concentrated market. 7/ In The Stanley Works, 78 F.T.C. 1023 (1971), aff'd, 469 F.2d 498 (2d Cir. 1972), cert. denied, 412 U.S. 928 (1973), the Commission and the Court of Appeals for the Second Circuit found that the cabinet hardware industry in which four firms accounted for 49-51 percent of the market was "...sufficiently concentrated to invoke the proscriptive sanction of the Clayton Act..." 469 F.2d at 504.

The Supreme Court, in United States v. Aluminum Co. of America, 377 U.S. 271, 278 (1964), found that the relevant line of commerce was "highly concentrated" as the top five firms controlled 65.4 percent of the market and the top nine companies held 88.2 percent. Recently, the California gasoline market, in which the top four and seven firms accounted for 61 and 83 percent respectively of refining capacity and 58 and 81 percent respectively of sales, was held to be highly concentrated. United States v. Phillips Petroleum Co., 367 F. Supp. 1226, 1252 (C.D. Cal. 1973), aff'd mem., 42 U.S.L.W. 3710 (July 8, 1974).

BOC respondents have asserted that the value of shipments for industrial gases reported by the Bureau of the Census should not be considered as a reliable basis for establishing concentration in the industrial gases market. This assertion is based on the testimony of one witness who stated that value of shipment information required by the Census could be subject to different interpretation by different companies. He criticized the Census information as providing only the value of gases at the producing plant and not at the point of actual distribution. Further, his company did not normally measure company achievements on f.o.b. plant data.

Bureau of the Census reports are traditionally used in antitrust cases and their reliability is well established. See, e.g., Avnet, Inc., 78 F.T.C. 1562, 1563 n. 1 (1971).

7/ An authority frequently used by the Commission and the federal courts as a guideline for measuring concentration is C. Kaysen & D. Turner, Antitrust Policy: An Economic and Legal Analysis 72 (1959), which defines a "tight oligopoly" as an industry in which eight firms share at least 50 percent of the market and the largest firm has at least 20 percent.

reporting companies are required by law to accurately report their value of shipments to Census. Industrial gases shipment reports have been made to Census for many years. Census reports are clearly as reliable, if not more so, than any overall industry data which could be compiled for the purpose of litigation.

Respondents also contend captive production of industrial gases should be included in the universe. This argument is without merit. Captive production is not part of the industrial gases industry; captive production is not available to serve the industrial gases market. There is no competition between such producers with respect to the industrial gases each produces and consumes. To the extent surplus production is available, the record establishes that such surplus is sold to industrial gases companies who resell in the marketplace (Finding of Fact 55). Thus, to include captive production in the market would not be meaningful in terms of trade realities; it would recognize competition where competition, in fact, does not exist.

BOC respondents misread Ford Motor Co. v. United States, 405 U.S. 562 (1972), aff'd, 315 F. Supp. 372 (E.D. Mich. 1970), and 286 F. Supp. 407 (E.D. Mich. 1968). There, the Supreme Court regarded AC Spark Plugs as a competitor in the spark plug market, although AC was owned by General Motors and AC plugs were installed as original equipment in GM cars. Of critical importance in that case, however, was the fact that GM actively marketed AC plugs in the spark plug market including the lucrative replacement market. GM did not simply manufacture its spark plugs as a necessary component or input to its car production.

Respondents also attempt to dilute market statistics by including in the industrial gases market, production and sales of other products such as propane, butane, propylene, chlorine and sulphur dioxide. These gases are not considered as part of the industrial gases industry. The bulk of such gases are sold by other industries for different purposes. To the extent such gases are sold by industrial gases companies, the volume is insignificant (Finding of Fact 39).

Moreover, it is well settled that precise market data in antitrust cases is simply not necessary. For example, in Brown Shoe Co. v. United States, supra, the defendant

argued that the government's statistics concerning its own sales were improperly derived since they included both wholesale and retail sales in the same category. The Supreme Court rejected the argument, stating:

> "Again, while recognizing a possible margin of error in statistics combining sales at two levels of distribution, we believe they provide an adequate basis upon which to gauge Brown sales through outlets it controlled... In summary, although appellant may point to technical flaws in the compilation of these statistics, we recognize that in cases of this type precision in detail is less important than the accuracy of the broad picture presented. We believe the picture as presented by the government in this case is adequate for making the determination required by §7: whether this merger may tend to lessen competition substantially in the relevant markets. (370 U.S. at 342 n. 69).

The Commission has also recognized that the government is not required to establish the exact size of a market in Section 7 cases. In Papercraft Corp., 78 F.T.C. 1352, 1405-06, (1971), aff'd, 472 F.2d 927 (7th Cir. 1973). the Commission held that estimates by experienced members of the industry were an adequate basis for determining the size of the relevant market. It is thus concluded that market data in this proceeding is sufficiently precise to present an accurate assessment of market concentration in the industrial gases industry.

D. Potential Competition

The Supreme Court, in Brown Shoe Co. v. United States. 370 U.S. 294, 315 (1962) stated:

> "The dominant theme pervading congressional consideration of the 1950 Amendments was a fear of what was considered to be a rising tide of economic concentration in the American economy...."

The greater the concentration "the greater is the likelihood that parallel policies of mutual advantage, not competition, will emerge." United States v. Aluminum Co. of America, 377 U.S. 271, 280 (1964). The Court also observed that "...competition will be most vital when there are many sellers, none of which has any significant market share." Ibid.

Decisions by the Supreme Court have made it abundantly clear that Section 7 of the Clayton Act is to be construed at the possibility of not only preventing the rising tide of economic concentration, but preserving the possibility of eventual deconcentration. Further, Section 7 deals with probabilities, not with certainties. FTC v. Proctor & Gamble Co., 386 U.S. 568, 577 (1967). Section 7 "look[s] not merely to the actual present effect of a merger but instead to its effect upon future competition." United States v. Von's Grocery Co., 384 U.S. 270, 277 (1966).

With these basic premises in mind, the elimination of potential competition as well as actual competition is prohibited by Section 7. United States v. Falstaff Brewing Corp., 410 U.S. 526 (1973); Ford Motor Co. v. United States, 405 U.S. 562 (1972); United States v. Proctor & Gamble Co., supra; United States v. Penn-Olin Chemical Co., 378 U.S. 158 (1964); United States v. El Paso Natural Gas Co., 376 U.S. 651 (1964). The potential competition doctrine has meaning only as applied to concentrated or oligopolistic markets. "The present procompetitive effects that a perceived potential entrant may produce in an oligopolistic market will already have been accomplished if the target market is performing competitively. Likewise, there would be no need for concern about the prospects of long-term deconcentration of a market which is in fact genuinely competitive." United States v. Marine Bancorporation, Inc., 42 U.S.L.W. 5210, 5218 (U.S. June 25, 1974).

There are two kinds of potential competition which an acquisition may foreclose. An acquisition may eliminate the procompetitive influence that a firm which is positioned on the edge of a market, threatening to come in, exerts upon the behavior of the companies within the market. Secondly, an acquisition may eliminate the likelihood of a procompetitive entry into a market by an actual potential competitor, i.e., a firm that, were it not for the acquisition, would likely have entered the market either de novo or by a toehold acquisition.

A party to an acquisition may be both a perceived potential entrant and an actual potential entrant. In such an instance, the acquisition would foreclose both types of potential competition. The elimination of either type of potential competition by itself renders an acquisition illegal under Section 7. E.g., United States v. Phillips Petroleum Co., 367 F. Supp. 1226, 1235 (C.D. Cal., 1973), aff'd without opinion, 42 U.S.L.W. 3710 (July 8, 1974); United States v. Falstaff Brewing Corp., supra, at 538 (Douglas, J., concurring). An acquisition which eliminates a company that is both a perceived and an actual potential entrant "renders the anticompetitive consequences of the acquisition even greater." Phillips Petroleum Co., supra. (367 F. Supp. at 1234).

The procompetitive influence exerted by a perceived potential entrant has been succintly stated by the Supreme Court in United States v. Penn-Olin Chemical Co., supra at 174:

> "The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be substantial incentive to competition which cannot be underestimated."

The potential entry effect of an actual potential entrant arises from the likelihood of actual market entry by the potential competitor at some time in the future and set the stage for noticeable deconcentration. The merger deprives the market of the procompetitive effect of an increase in the number of competitors. United States v. Ford Motor Co., supra at 587 (Burger, J., concurring).

BOC argues that the record in this proceeding is filled with references to price wars and severe competition, with evidence of declining prices, product surpluses, and low profitability. Hence, the doctrine of potential competition does not apply to this case (BOC PF 190). The Administrative Law Judge had concluded just the opposite, that the market is highly concentrated, entry barriers are high, prices have firmed substantially, product shortages exist, and that, in fact, there is evidence the major companies stay out of each other's way (Findings 49-76). Thus, the doctrine of potential competition is highly applicable to this proceeding.

E. The Acquisition of Airco Eliminated BOC as a Significant Perceived Potential Entrant

Prior to BOC's stock acquisition in Airco, BOC was perceived by companies within the industrial gases market in the United States as waiting on the edge of the market for the right opportunity to enter. Members of the U.S. industrial gases industry not only recognized BOC as one of the few firms possessing the necessary resources, technical knowledge and expertise and marketing capability to enter the U.S. market, but also believed BOC was very likely to enter. Indeed, the two largest U.S. industrial gases firms not only perceived BOC as the firm most capable and most likely to enter the industrial gases market in the United States, but both Linde and Air Products anticipated BOC would enter the U.S. industrial gases market at some time in the future (Flamm 250-52, 335; Baker 392). Executives of Alabama Oxygen and Burdett of Cleveland anticipated market entry by BOC (Kimerling 876, 878; Loveman 613). Dr. Muller, a consultant in the industrial gases industry in the United States, also anticipated BOC would enter the U.S. market (Muller 682).

Moreover, the belief by firms in the U.S. market that BOC was a likely entrant was well founded. BOC had actively pursued various means of entry into the U.S. industrial gases market since at least 1968, and had participated in the U.S. market with Airco in a joint venture selling industrial gases plants. BOC was known to have the resources, technical knowhow, and marketing expertise to enter the market. BOC was recognized as being an international company with 50 percent of its profits coming "off-shore the United Kingdom" (Flamm 238). BOC had entered the industrial gases market in numerous countries since 1956, most recently Brazil (Finding of Fact 85). The United States industrial gases market is the largest and most technically advanced market in the world, and in 1973, the market was very bouyant (Findings of Fact 86-87, 49-51). The attractions of the United States market to an international company was very well appreciated by U.S. industrial gases companies (Flamm 25). Further, BOC was the most likely potential entrant into the U.S. industrial gases market (Findings of Fact 90-93).

In sum, based on BOC's history of being an international company and having entered numerous industrial gases markets around the world, and possessing the resources, technical ability, marketing knowhow and the motivation and incentives to enter the U.S. market, having made numerous contacts beginning in 1968, with U.S. firms concerning possible acquisition or market entry, having participated in the joint venture with Airco and being located in the adjacent Canadian market, considering the bouyant nature of the U.S. industrial gases market as of 1973, and the testimony of industry executives that they believed BOC to be the most likely entrant into the market, it must be concluded that BOC was a perceived potential entrant into the U.S. industrial gases market.

F. BOC Exerted Beneficial Influence on Competitive Conditions in the United States Industrial Gases Market

The Supreme Court in Falstaff Brewing Corp., supra, made it clear that an acquisition which eliminates a perceived potential entrant violates Section 7 if the potential competitor was so positioned on the edge of the market that it exerted beneficial influence on competitive conditions in that market (410 U.S. at 532-33).

In a lengthy footnote to the majority opinion in Falstaff, the Supreme Court spelled out the nature of evidence to be considered in weighing the effects of the elimination of a perceived potential entrant:

> "The Government did not produce direct evidence of how members of the New England market reacted to potential competition from Falstaff, but circumstantial evidence is the lifeblood of antitrust law, ... (citations omitted) especially for §7 which is concerned 'with probabilities, not certainties,' Brown Shoe Co. v. United States, 370 U.S. at 323. As was stated in United States v. Penn-Olin Chemical Co., 378 U.S. 158, 174 (1964), '[p]otential competition cannot be put to a subjective test. It is not

'susceptible of a ready and precise answer.'

"Nor was there any lack of circumstantial evidence of Falstaff's on-the-fringe competitive impact. As the record shows, Falstaff was in the relevant line of commerce, was admittedly interested in entering the Northeast, and had among other ways...made its interest known by prior-acquisition discussions. Moreover, there were...objective economic facts as to Falstaff's capability to enter the New England market; and the same facts... would be probative of violation of §7 through loss of a procompetitive on-the-fringe influence." (410 U.S. at 534-35 n. 13).

The approach suggested by the Supreme Court in Falstaff was followed by the District Court in assessing the competitive impact of the acquisition by Phillips Petroleum Company of the Western Manufacturing and Marketing Division of Tidewater Oil Company in United States v. Phillips Petroleum Co., supra. On the basis of objective evidence, the District Court held that the acquisition was illegal under Section 7. Just recently, the District Court's decision was unanimously affirmed without opinion by the Supreme Court. 42 U.S.L.W. 3710 (U.S. July 8, 1974).

The District Court concluded that Phillips' elimination as both a perceived and actual potential entrant had substantial anticompetitive effects within the meaning of Section 7, on the basis of the following standard of proof:

"[W]here credible objective evidence shows the basic economic facts of the acquiring company's overall size, resources, capability, and motivation with respect to entry into an adjacent attractive market involving a line of commerce in which the firm is already heavily engaged, that firm must be considered to be a significant potential entrant unless it is objectively demonstrated that some unique feature of the market precludes such entry. Moreover, where the market is concentrated and there

> are few such likely entrants, whether due to the existence of high barriers to entry or for other reasons, no further inquiry is required as to the anticompetitive effect of the acquisition, and that effect must be considered to be substantial within the meaning of 7." (367 F. Supp. at 1237).

BOC argues that the Supreme Court's recent decision in United States v. Marine Bancorporation, 42 U.S.L.W. 5210, 5215 (June 26, 1974), requires proof that firms in the industry in fact guided their conduct in light of the perceived entrant's presence on the market fringes (BOC PF 168). Industry officials in the present proceeding testified that they had not made any business decisions based on the perceived potential entry of BOC into the U.S. industrial gases market (Finding of Fact 31). Mr. Flamm of Linde testified that such factors were "a degree of sophistication that did not enter our considerations." (Flamm 336).

Voluminous economic evidence in this record demonstrates that BOC's position on the fringe of the U.S. industrial gases market exerted a procompetitive influence on the market. This economic evidence satisfies any burden which may have been set forth in Marine Bancorporation since Section 7 deals with probabilities, not certainties. FTC v. Procter & Gamble Co., 386 U.S. 568, 577 (1967). The industrial gases market is highly concentrated with only three national "bulk" producers. 8/ Barriers to entry are extremely high. BOC was the most likely potential entrant into the market with few, if any, other potential entrants. BOC's financial strength and experience in entering industrial gases markets throughout the world indicated BOC's capability of entering the U.S. industrial gases market on a unilateral basis. BOC had the economic incentive to enter the U.S. market, and in 1973, the market was ripe for entry. BOC had been actively exploring methods of market entry since

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8/ Industry members do consider existing competitors in their marketing discussions, particularly the big three bulk producers (Flamm 305, 350).

1968. Further, there are no unique features of the U.S. industrial gases market which would preclude entry by BOC. Thus, it must be inferred that BOC's position as a perceived potential entrant had a procompetitive effect on the U.S. industrial gases market.

F. The Acquisition of Airco Eliminated BOC as an Actual Potential Entrant

The elimination through merger of an actual potential entrant can be unlawful "[A]lthough its competitive conduct in the market may be the mirror image of that of the acquired company" since the entry eliminates a potential competitor exercising present influence on the market, United States v. Falstaff Brewing Corp., 410 U.S. 526, 532 (1973); it also eliminates the possibility of eventual market deconcentration. United States v. Ford Motor Company, 286 F. Supp. 407 (E.D. Mich. 1968), aff'd, 405 U.S. 562, 587 (1972) (Burger, J., concurring in part).

Strong objective evidence of record indicates that BOC would have eventually entered the U.S. industrial gases market either de novo or through toehold acquisition. BOC had a "long-term objective" of expanding its international operations and BOC's chairman admitted the Airco acquisition was in furtherance of this objective. The U.S. market is the world's largest industrial gases market and the most technically advanced. BOC needed to be "in tune" with this technology (Smith 1788). BOC could not be truly "multi-international" without operating in the North American market (Smith 1731). BOC needed to be in competition with its American-based competitors "on their home grounds" to survive internationally (CX 38C; see Findings of Fact 84-87).

BOC continuously investigated methods of entry into the U.S. market from 1968 through 1973, including hiring a consultant who was a specialist in industrial gases, making an extensive investigation of the industrial gases market in 1969-1970, and holding acquisition discussions with several small industrial gases companies, including commencing a study of possible acquisition of Airco in June 1973 (Findings of Fact 90-101). BOC had the financial resources, technical knowhow and marketing ability, and the economic incentives and motivation to enter the market. Further, there were no barriers to such entry by BOC.

BOC argues that testimony by BOC officials and BOC contemporaneous documents prove conclusively BOC would not have entered the U.S. industrial gases market except for the Airco acquisition. The testimony by BOC officials, however, must be viewed in the light of other testimony given in this proceeding, and in light of other evidence of record. The BOC officials admitted there were strong economic incentives for BOC to enter the U.S. industrial gases market (Findings of Fact 103-107), and they authorized extensive acquisition discussions with several U.S. industrial gases firms. Thus, self-serving testimony that BOC would never enter the U.S. market de novo or by toehold acquisition can be given little weight.

BOC stresses two contemporaneous documents, (1) the Perham-Greenfield report of the BOC 1969-1970 investigation of the industrial gases industry, and (2) an internal budget and forecast for the development of business through 1973 (Finding of Fact 108).

The Perham-Greenfield report does not represent a BOC decision not to enter the U.S. industrial gases market. It was a report to the BOC managers on the U.S. market as of early 1970, and it was negative on entry by BOC at that time. However, the report recommended that BOC continue to look for future opportunities in the U.S. market (Finding of Fact 95).

The July 1970 BOC budget and forecast did not authorize any funds for entering the U.S. industrial gases market through 1973. However, Peter Laister, a director of BOC, testified that funds for acquisitions are left out of planning documents when it is uncertain what acquisitions will occur in the future (Finding of Fact 109). Mr. Laister also stated that in any large business you obviously cannot read the future a few years out.

There is no other documentation in the record to establish that BOC made a business decision not to enter the U.S. industrial gases market. If such a decision had been reached, it is inconceivable that BOC would have authorized several extensive merger discussions with U.S. firms after receipt of the Perham-Greenfield report. Further, the $80 million needed for the Airco transaction did not appear in any planning documents. Thus, this subjective evidence of BOC's state of mind is not persuasive.

The subjective evidence discussed above does not overcome the strong objective evidence of BOC's likely entry into the U.S. industrial gases market. It is well settled that subjective evidence of management's intent is entitled to little weight in determining whether a company is an actual potential entrant. The Supreme Court expressly rejected reliance on such subjective evidence in United States v. Penn-Olin Chemical Co., 378 U.S. 158 (1964). After a full review of objective evidence in that case showing the capability and incentives of joint venturers to enter a market independently, the Court held (at p. 174):

> "Unless we are going to require subjective evidence, this array of probability certainly reaches the prima facie stage. As we have indicated, to require more would be to read the statutory reuuirement of reasonable probability into a requirement of certainty. This we will not do."

In his concurring opinion in United States v. Falstaff Brewing Corp., 410 U.S. 526, 545 (1973), Justice Marshall elaborated reasons for giving subjective evidence limited consideration in actual potential entry cases (at pp. 567-569):

> "The reasons for so limiting the role of subjective evidence are not difficult to discern. Such evidence should obviously be given no weight if it is not credible. But it is in the very nature of such evidence that in the usual case it is not worthy of credit. First, any statement of future intent will be inherently self-serving. A defendant in a §7 case such as this wishes to enter the market by acquisition and its managers know that its ability to do so depends upon whether it can convince a court that it would not have entered de novo if entry by acquisition were prevented. It is thus strongly in management's interest to represent that it has no intention of entering de novo -- a representation which is not subject to external verification and which is so speculative in nature that it could virtually never serve as the predicate for a perjury charge.
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> * * *

> "Thus, in most cases, subjective statements contrary to the objective evidence simply should not be believed. But even if the threshold credibility gap is breached, it still does not follow that subjective statements of future intent should outweigh strong objective evidence to the contrary. Even if it is true that management has no present intent of entering the market de novo, the possibility remains that it may change its mind as the objective factors favoring such entry are more clearly perceived."

BOC also argues that it is incumbent upon complaint counsel to show that de novo or toehold entry was economically feasible and attractive. BOC stresses that there was no evidence at all to the effect that such a course of action would have been reasonably likely to yield even a modest profit (BOC PF*177).

Moreover, it is argued that after BOC offered testimony that de novo entry designed to produce a viable national competitor would have cost about $250 million, taken at least 10 years to show a profit, and would not have been a prudent business decision, complaint counsel offered no rebuttal (BOC PF*178). BOC also points out that there was no evidence offered as to the asking prices or the profitability of small industrial gases companies which were available for acquisition.

BOC would impose an impossible burden on a trial record. It would be nearly impossible to determine reasonableness of asking prices of firms in the industry, and literally impossible to establish at what point in time de novo entry would produce a viable national competitor and return a "modest profit". It may have been easier and more immediately profitable for BOC to enter the U.S. industrial gases market purchasing a large existing market share than it would be for BOC to have to engage in the competitive struggle necessary to win a significant market share by de novo or toehold entry. "But the test in Section 7 cases is not whether anticompetitive conduct is profit maximizing. The very purpose of Section 7 is to direct the profit incentive into channels which are procompetitive." Falstaff Brewing Corp., supra (Marshall, Jr., concurring), at p. 572.

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There is, moreover, substantial evidence of record showing that de novo entry or toehold acquisition would have been both feasible and attractive to BOC. The record is manifestly clear that BOC had the resources, technical knowhow and marketing experience to enter the U.S. industrial gases market de novo or by toehold acquisition. BOC found it economically feasible and attractive to enter de novo and by toehold acquisitions industrial gases markets in 19 different countries throughout the world. BOC found it economically feasible and attractive to recently enter the industrial gases market in Brazil de novo by building a small plant. The Brazilian and the U.S. industrial gases markets have comparable growth rates (Baker 2732).

Air Products' successful de novo entry into the industrial gases market in Great Britain in 1957 also demonstrates by analogy the feasibility and attractiveness of entry by BOC on a small scale into the U.S. industrial gases market. In 1957, Air Products was a small company and its entry into Great Britain was its first overseas penetration. It did not have the resources and world wide marketing experience that BOC had at the time of BOC's stock acquisition in Airco. Air Products began its operations in Great Britain by building very small plants and it had to compete with BOC, whose market share was in excess of 95 percent. Despite its meager beginning, Air Products was able subsequently to obtain a 25 percent share of the Great Britain industrial gases market (Baker 2738). Further, Air Products found it attractive to recently enter the Canadian market where it markets products from its U.S. gases plants, pays a 10 percent tariff, and has at the present less than 1 percent of the market (Baker 396-99, 2713-15).

Further convincing evidence of the feasibility and attractiveness of entering the U.S. industrial gases market by toehold acquisition is the successful entry by Liquid Air in 1968 through acquisition of American Cryogenics, a small company that was losing $4 million a year at the time of its acquisition. Liquid Air was able to turn American Cryogenics into a profitable operation. Furthermore, market conditions in 1968 were not as advantageous for entry into the market as conditions in recent years. Liquid Air has also been able to extend its initial penetration into the U.S. market through acquisition of other toehold firms and by internal expansion (CX 345H, in camera; Dempster 511, 518-19, 528-530, 552).

The record also establishes that had BOC not acquired a stock interest in Airco, it would have been an opportune time for BOC to enter the U.S. industrial gases market de novo by competing for tonnage supply schemes for industrial gases. BOC had already established itself in the United States market as a supplier of air separation plants through its joint venture with Airco which designed and sold air separation plants in the United States from 1967 through 1971. In recent years the demand for industrial gases in tonnage quantities has been increasing faster than the capacity of the U.S. industry to construct plants, and BOC could successfully compete in the United States for tonnage accounts (Baker 2734-35). Tonnage accounts are profitable (Baker 2741).

The prevailing market conditions of increased demand and shortage of production capacity also would make it an opportune time for BOC had it not acquired stock in Airco to enter the U.S. industrial gases market by acquisition and expansion of a toehold firm. The evidence of record clearly shows that entry into the U.S. industrial gases market by toehold acquisition was available to BOC. At the time BOC acquired the stock of Airco, there were a number of attractive small U.S. industrial gases producers available for acquisition, including Burdett of Norristown, Northern Gases, and Alabama Oxygen (Lovelace 736; Perkins 784; Kimerling 876; Baker 2750, 2781). Further, Burdett of Cleveland, which BOC denigrates, was the subject of several BOC acquisition discussions, and in the fall of 1973, before the Airco acquisition, BOC was still interested in acquiring Burdett (Lovelace 591-92). Entry by toehold acquisition was available to BOC. (See Bates, Judge's decision in Kennecott Copper Corp., 73 F.T.C. 744, 947 (1971), aff'd, 467 F.2d 67 (10th Cir. 1972), cert. denied, 94 S.Ct. 1617 (1974), where the existence of toehold firms in the market was stated to be sufficient to show the availability of entry by toehold acquisition.)

Executives of two of the largest industrial gases firms in the United States testified that BOC could enter the U.S. industrial gases market by a toehold acquisition, by building a tonnage plant, by building a tonnage plant with incremental capacity to serve the merchant market, or by any combination thereof (Flamm 260; Baker 393-94, 2734-2735). Early 1974 would have been an opportune time to enter the U.S. industrial gases market (Baker 2735).

Thus, it is concluded that de novo or grass roots entry into the U.S. industrial gases market was feasible and economically attractive to BOC. It is further concluded that there were toehold firms that could have been acquired by BOC on a practical basis. It is also concluded that, as of December 1973, BOC was an actual potential entrant into the U.S. industrial gases market either de novo or by toehold acquisition; its entry would have increased the number of effective competitors in the market. BOC was committed to becoming a viable national firm with at least 5 percent of the market. Thus, BOC would have been compelled to seek its place in the market at the expense of the established firms, and this effort by BOC would have resulted in a procompetitive effect in the marketplace.

Further, the substantiality of the anticompetitive effect resulting from the elimination of an actual potential entrant may be inferred from the objective facts as are present in this case. Objective evidence establishes that BOC was an actual potential entrant, that the market is highly concentrated, and that there are high barriers to entry and few, if any, other likely entrants. Thus, no further inquiry is required into the anticompetitive effects of the acquisition and the effect must be considered substantial within the meaning of Section 7. United States v. Phillips Petroleum Company, 367 F. Supp. 1226, 1239 (C.D. Cal. 1973); see United States v. Falstaff Brewing Corp., 410 U.S. 526, 532 (1973). 9/

9/ Even if BOC's conduct in the marketplace is the "mirror image" of that of Airco (see United States v. Falstaff Brewing Corp., 410 U.S. at 532 (1973)), it appears that Section 7 is nevertheless violated. The Court, in Falstaff, stated that it would "leave for another day" the question of the applicability of Section 7 to a merger that will leave competition in the marketplace exactly as it was, neither hurt nor helped. (Id. at 537.) However, as observed by Justice Marshall, Section 7 prohibits an entry by acquisition [other than toehold] since such an acquisition eliminates the possibility of future actual competition. (Id., Marshall, J., concurring, at 541.) Thus, even if de novo or toehold entry by BOC did not have immediate procompetitive effects, there is the possibility that such entry would have such effects at some time in the future. This is sufficient to establish a violation of Section 7, which looks to possibilities - not certainties, and looks to the future as well as the present.

G. Acquisition of Airco by BOC Increased Entry Barriers in the U.S. Industrial Gases Market

Airco, one of the dominant firms in the U.S. industrial gases market was acquired by BOC, a company with substantial resources and technical and marketing skills and apparently the second largest industrial gases company in the world. It must be concluded that such an acquisition increased concentration in the market and substantially increased what were already exceeding high entry barriers.

H. Airco Is Not A Toehold

Airco clearly does not meet the criteria for a toehold firm as its assets and market position enabled BOC instantly to achieve a dominant, national position in the U.S. industrial gases market without any expansion effort. BOC's chairman testified that BOC would need over five percent of the national market to be a vieble competitor (Smith 1837). Airco's share of the U.S. industrial gases market substantially exceeds that percentage.

The District Court in United States v. Phillips Petroleum Co., 367 F. Supp. 1226, 1250 (C.D. Cal. 1973), defines a toehold acquisition as:

> ". . . one which is sufficient to assist the potential entrant over the entry barriers and into the market, but not so large that the entrant merely replaces the acquired company; the acquiring company must have a substantial need to build upon the acquisition. Such a foothold acquisition is fully consistent with the concept of unilateral entry, since both envision a significant market penetration effort by the entering company quite apart from whatever assets or market position have been acquired."

Under the above definition, with which the Administrative Law Judge is in accord, Airco clearly is not a toehold acquisition.

II. INHALATION ANESTHETIC EQUIPMENT

A. Inhalation Anesthetic Equipment Comprises a Line of Commerce

Inhalation anesthetic equipment and accessories fall within the criteria for defining product markets set forth by the Supreme Court in Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962):

> "The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it. However, within this broad market, well-defined submarkets may exist which, in themselves, constitute product markets for antitrust purposes. ... The boundaries of such a submarket may be determined by examining such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes and specialized vendors."

The Court further emphasized that:

> ". . . it is necessary to examine the effects of a merger in each such economically significant submarket to determine if there is a reasonable probability that the merger will substantially lessen competition." (Ibid.)

It is now well established that it is not necessary for each of the seven criteria set forth in Brown Shoe to be present in every merger case in order to establish a market; a relevant market has been found to exist where less than all of the Brown Shoe criteria were present. United States v. E. I. duPont de Nemours & Co., 353 U.S. 586, 593-95 (1957); General Foods Corp. v. F.T.C., 386 F.2d 936, 941 (3rd Cir. 1967); Reynolds Metals Co. v. F.T.C. 309 F.2d 223, 227 (D.C. Cir. 1962).

Applying the Brown Shoe criteria, it is clearly established that inhalation anesthetic equipment and accessories are a separate and distinct market. The medical profession, as well as firms in the industry, recognize inhalation anesthetic equipment and accessories as constituting a separate market. Inhalation anesthetic equipment and accessories have peculiar characteristics and uses, i.e., supplying anesthetic vapors to patients during surgical procedures. Production facilities for inhalation anesthetic equipment and accessories are unique, owing to the unique nature of the technology of supplying gases for anesthesia. Customers buying or using inhalation anesthetic equipment and accessories are distinct from those buying or using medical products generally. Inhalation anesthetic equipment and accessories are priced markedly higher than comparable equipment used in other medical applications. 10/

BOC respondents point out that there is a profusion of products in the IAE market and that individual IAE products are not interchangeable (BOC FF 311). On that basis, BOC argues that IAE products are not a relevant product market. However, the principal product in IAE, the anesthesia machine, consists of nearly every product in the IAE market. The remaining items in the IAE market are necessary in order for the patient to effectively receive the anesthetic vapors. Additionally, there is a degree of interchangeability among surgical, veterinary and dental anesthesia machines. These products have the common distinction of all being used by the anesthesiologist to provide for anesthesia. The surgical, veterinary and dental anesthesia machines utilize common

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10/ Inhalation anesthetic equipment and accessories must be semi-conducive to avoid danger of explosion. This pushes the cost of such items substantially above that of otherwise comparable or even identical items used in the practice of inhalation therapy. This price differential is further enhanced by the greater precision needed in equipment for the administration of potentially lethal anesthetic agents than that for the administration of gases for therapeutic purposes (Hedley-Whyte 1278).

technology to perform the identical purpose of inducing anesthesia in surgical procedures.

B. IAE Geographic Market

Manufacturers of inhalation anesthetic equipment and accessories generally market their products throughout the United States. Airco markets inhalation anesthetic equipment and accessories throughout the United States, as does BOC's subsidiaries, Fraser Sweatman and Harris-Lake. The acquisition will thus have a direct and immediate effect upon competition in the IAE market throughout the United States.

Accordingly, the United States as a whole is the relevant geographic market in which to appraise the effects of BOC's acquisition of Airco stock upon competition in inhalation anesthetic equipment and accessories. United States v. Marine Bancorporation, Inc., 42 U.S.L.W. 5210, 5215 (U.S. June 26, 1974); United States v. Pabst Brewing Co., 384 U.S. 546, 549 (1966). Respondents do not dispute the geographic market.

C. Market Concentration

The record establishes that the IAE market is highly concentrated. Airco is the dominant firm in the IAE market; the consortium of BOC and its subsidiaries, Fraser Sweatman and Harris-Lake, constitute a substantial part of the market. The record reveals that in the manufacture and sale of the anesthesia machine, three companies completely dominate the market -- Airco, Foregger and BOC.

The record also reveals that barriers to entry are high, i.e., technological expertise in manufacturing and marketing; the need for sales and service organization; high capital costs; brand loyalty; and the entrenchment of the leading companies in the marketplace. An already highly concentrated market with high entry barriers obviates the need to show a trend in concentration. Stanley Works, 77 F.T.C. 1023, 1065 (1971), aff'd, 469 F.2d 498, 503-504 (2nd Cir. 1972), cert. denied, 412 U.S. 928 (1973).

D. Competitive Effects

No difficult or novel issue is involved in appraising

the effect of BOC's acquisition of Airco stock in the IAE market in the United States. The facts disclose a clear violation of Section 7. The Supreme Court has repeatedly struck down mergers between actual competitors with considerably smaller market shares than those of Airco and BOC. In Brown Shoe, supra, the Court determined that a merger resulting in a combined market share of 5% would be illegal. 370 U.S. at 343-44. Similarly, acquisition of the ninth-ranked firm, with 1.3 percent of the aluminum conductor market by the market leader, with 27.8 percent of the market, was struck down by the Court in United States v. Aluminum Co. of America (Alcoa-Rome), 377 U.S. 271 (1964), as was a merger between the sixth- and seventh-ranked firms with 5.84 and 5.48 percent, respectively, of the three-state beer market in Pabst, supra. The Court in Pabst also found the merger unlawful, anticompetitive in the national beer market where the two firms ranked tenth and eighteenth and had a combined market share of 4.49 percent of total U.S. beer sales. With a combined market share of 8.9 percent, a merger between the third-ranking firm with 4.7 percent and the sixth-ranking firm with 4.2 percent of the market was likewise invalidated by the Court in United States v. Von's Grocery Co., 384 U.S. 270 (1966).

In United States v. Philadelphia National Bank, 374 U.S. 321, 363 (1963), the Supreme Court set forth the test for judging horizontal acquisitions between significant competitors:

> "Specifically, we think that a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects."

Concentration in the inhalation anesthetic equipment market is very high. The market shares of the top four firms in 1972 totaled 64.5 percent, and the top eight firms had 87.9 percent of the total market. Where "concentration is already great," the Supreme Court has observed, "the importance of preventing even slight increases in concentration and so preserving the possibility of eventual deconcentration is correspondingly great." Philadelphia National Bank, supra, 374 U.S. at 365, n.42; Alcoa, supra, 377 U.S. at 279; United States v. Continental Can, 378 U.S. 441, 461-62 (1964).

Although it is not necessary to show the further likelihood of anticompetitive effects of the acquisition, such effects clearly present themselves in this market. While no firm in the IAE market has been able to approach Airco's market dominance, BOC has shown itself to be a formidable factor in the market. Instead of expanding its market share, with the possibility of market deconcentration, BOC joined forces with Airco to increase substantially Airco's market dominance. Thus, the merger of Airco and BOC increased concentration, heightened entry barriers, and more firmly entrenched Airco in the IAE market.

III. INHALATION THERAPY EQUIPMENT

A. Inhalation Therapy Equipment Comprises a Line of Commerce

The product market criteria set forth in Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962), discussed hereinbefore in connection with the IAE market, establishes ITE as a relevant product market within which the effects of BOC's acquisition of Airco stock under Section 7 may be considered. ITE is recognized by the medical profession and by the firms in the industry as constituting a separate entity. ITE has peculiar characteristics and uses. Customer users and purchasers of ITE are distinct and the price of ITE is distinct from the prices of IAE (see infra, p. 105).

ITE is comprised of the equipment and accessories used in the administration of gases for therapeutic purposes. There is also a distinct group of medical paraprofessionals referred to as "inhalation therapists" and recently as "respiratory therapists" who specialize in inhalation therapy (Hedley-Whyte 1210-11; Karpick 1396). Although the duties of these professionals has in recent years expanded to include other aspects of respiratory care, they primarily are responsible for the administration of gases for therapeutic purposes, i.e., inhalation therapy (Karpick 1393, 1396). Inhalation therapists are further differentiated from other medical personnel by virtue of their specialized training. They are certified and registered as respiratory therapists. Further, respiratory therapists have their own professional organization and medical journal (Hedley-Whyte 1210-1211; Karpick 1395). Inhalation therapy is recognized by the medical profession as a subsection of the broad field now referred to as respiratory therapy.

ITE equipment has a specialized production technology and requires specialized vendors to successfully market the products. ITE is distinct from IAE, and is separate from other respiratory therapy equipment such as suction equipment and monitoring equipment. ITE meets the criteria set forth in Brown Shoe, supra, 370 U.S. at 325, sufficiently to constitute a submarket for Section 7 purposes.

B. Geographic Market

The acquired firm, Airco, markets inhalation therapy equipment and accessories nationwide, as do its competitors, including BOC's subsidiary. The acquisition's effect will be felt directly and immediately in the ITE market throughout the United States. The United States as a whole is, therefore, the relevant geographic market in which to appraise the effects of BOC's acquisition of Airco stock upon competition in inhalation therapy equipment and accessories. United States v. Marine Bancorporation, Inc., 42 U.S.L.W. 5210, 5215 (U.S. June 26, 1974); United States v. Pabst Brewing Co., 384 U.S. 546, 549 (1966). Respondents do not dispute the geographic market.

C. Market Concentration

The ITE market is concentrated, although not as concentrated as the IAE market. Further, in the ITE market Airco is not the dominant firm that it is in the IAE market. The sales of ITE by BOC and its subsidiaries are not very substantial (Table II, in camera). It is doubtful that the complaint in this matter would have been brought based on the market shares in the ITE market alone. However, other more substantial markets are involved in this proceeding [industrial gases and IAE]; and other significant factors are involved in the sale of ITE, such as the formidable position of BOC in the medical markets throughout the world, and BOC's intention to and capability of unilaterally expanding ITE sales in the United States.

D. Competitive Effects

Although the inhalation therapy equipment and accessories market is composed of many companies, the bulk of the sales in the market are concentrated in the hands of a few firms.

Airco is a substantial factor in the ITE market and BOC's subsidiary, Harris-Lake, backed by BOC, had established itself as a significant competitor.

Substantial barriers to entry and expansion limit the potential for growth of small firms in the rapidly growing inhalation therapy equipment and accessories market. Backed by BOC's vast capital, technological and marketing skills, BOC's operations not only had the ability to expand in this market, but were already doing so. Thus BOC's subsidiary, Harris-Lake, though small, was a significant and closely watched competitor. BOC had carefully devised its strategy for growth when it entered the U.S. market. Through internal expansion, acquisition of other small competitors, or a combination of both approaches, BOC intended to become a significant firm in the U.S. inhalation therapy equipment and accessories market.

The fact that BOC had taken steps to accomplish its expansion goals made BOC a highly significant factor in the market. There can be little doubt that within a short span of time, BOC would have significantly increased its share of the ITE market. As a firm with immense resources and capabilities, already in the market, BOC exerted a significant restraining influence on the market leaders beyond its small market share, and was a strong force for competition.

Section 7 dictates that a small, significant competitor such as BOC, with its capability, interest, and incentives to expand, must be compelled to pursue internal development in lieu of an acquisition inimical to competition. United States v. Philadelphia National Bank, 374 U.S. 321, 370 (1963); United States v. Standard Oil Company (New Jersey), 253 F. Supp. 196, 227 (D.N.J. 1966).

As recognized by the Second Circuit in Stanley Works, supra, at 508:

> "[t]he continued independence of companies with relatively small market shares is ... crucial to the health and vitality of a market threatening to become oligopolistic."

The legal principle set forth in Stanley Works is well established. The Supreme Court earlier noted that "the basic premise of ... [Section 7 is] that competition will be

most vital 'when there are many sellers, none of which has any significant market share.' United States v. Philadelphia National Bank, 374 U.S., at 363." United States v. Aluminum Co. of America, 377 U.S. 271, 280 (1964).

In Alcoa, only a dozen companies could claim market shares as large as one percent. This fact was specifically noted by the Supreme Court in finding the acquired firm, ranked ninth, with a 1.3 percent market share, a significant competitor. Alcoa, supra, at 281. In Stanley, ten firms had market shares as great as one percent and Stanley was ranked tenth. Similarly, outside the central core of dominant firms, of which Airco is a member, the inhalation therapy equipment and accessories market is composed of small competitors.

Section 7 "look[s] not merely to the actual present effect of a merger but instead to its effect upon future competition." United States v. Von's Grocery Co., 384 U.S. 270, 277 (1966). Elimination of competition between Airco and BOC in the ITE market has eliminated the probability of substantial future competition between the two firms, and has significantly increased entry barriers by combining BOC's tremendous resources and experience with Airco's existing market strength.

IV. THE ACQUISITION OF AIRCO STOCK BY BOC IS A VIOLATION OF SECTION FIVE OF THE FEDERAL TRADE COMMISSION ACT

An acquisition that violates Section 7 of the Clayton Act, as amended, also violates Section 5 of the Federal Trade Commission Act. E.g., Stanley Works v. F.T.C., 469 F.2d 498, 499 n.2 (2d Cir. 1972), cert. denied, 41 U.S. 928 (1973).

In the present case, BOC's acquisition of Airco stock violates Section 7 in several respects. The acquisition eliminated BOC both as a perceived potential entrant and as an actual potential entrant into the industrial gases industry in the United States. It also eliminated actual competition between BOC and Airco in the inhalation anesthetic equipment and accessories market and in the inhalation therapy equipment and accessories market. Therefore, the BOC acquisition also violated Section 5 of the Federal Trade Commission Act. Accordingly, BOC respondents, as charged in the complaint,

violated both Section 7 of the Clayton Act and Section 5 of the Federal Trade Commission Act.

Section 5 of the Federal Trade Commission Act also applies in the present case to Airco. The Commission has ruled that ". . . Section 5 is the proper statute under which to charge an acquired corporation where the acquisition substantially lessens competition." Dean Foods Co., 70 F.T.C. 1146, 1291 (1966). In Dean Foods, the Commission held that the acquired firm, Bowman Dairy Corporation, violated Section 5 by entering into a purchase contract for the sale of its assets to Dean Foods (70 F.T.C. at 1292).

Although Airco did not enter into an agreement to sell its assets to BOC, the record clearly shows that Airco was instrumental in BOC's acquisition of Airco's stock. First, Airco actively sought out BOC and provided confidential information with respect to its business operations to BOC. Airco and BOC entered into an agreement on July 25, 1973, which provided for an exchange of confidential information between the two companies and also prohibited either company from making a tender offer for the other company's shares for a period of five years without the approval of the other company's board of directors (Finding of Fact 25).

On December 10, 1973, Airco and BOC entered into another agreement in which Airco consented to BOC's tender offer for Airco shares. This agreement also provided for reciprocal representation by BOC and Airco on each other's board of directors. Further, the agreement gave Airco the right to purchase or designate a purchaser for any of the Airco shares acquired by BOC which BOC may subsequently sell (Finding of Fact 30).

Further, Airco actively assisted BOC in making its tender offer. Airco not only made its list of shareholders available to BOC, it also had Airco's transfer agent mail BOC's offer to Airco shareholders (Finding of Fact 30).

Airco's role in the acquisition of Airco stock by BOC was a significant part of the overall transaction. Airco actively opposed the Curtiss-Wright proposal and supported the BOC proposal. Accordingly, respondent Airco, as charged in the complaint, violated Section 5 of the Federal Trade Commission Act by taking affirmative actions which resulted in an acquisition prohibited by Section 7 of the Clayton Act and Section 5 of the Federal Trade Commission Act.

Moreover, it is proper to join Airco as a party respondent to this case since the relief to be entered may affect the rights and interests of Airco. Accordingly, Airco was a proper party to this action. See, e.g., United States v. Phillips Petroleum Co., 367 F. Supp. 1226, 1261-62 (C.D. Cal. 1973), aff'd mem., 42 U.S.L.W. 3710 (July 8, 1974), and the cases cited therein.

V. FORM OF RELIEF

BOC respondents have consented to the jurisdiction of the Commission (Finding of Fact 12), and the Commission has jurisdiction over Airco (Finding of Fact 20). Thus, the Commission has authority to enter whatever remedy may be necessary to restore competition to the status that existed prior to December, 1973, and to take steps to assure that the law will not be violated in the future.

It is well settled that the choice of the remedial order is committed to the discretion of the Commission. F.T.C. v. Mandel Bros., 359 U.S. 385, 392-93 (1959); L. G. Balfour Co. v. F.T.C., 442 F.2d 1 (7th Cir. 1971). Generally, the most appropriate remedy to redress a Section 7 violation is divestiture. Ford Motor Co. v. United States, 405 U.S. 562, 573 (1972); F.T.C. v. Proctor & Gamble Co., 386 U.S. 568 (1967).

In the present case, effective relief can only be achieved by complete divestiture of Airco's stock by BOC, removal of BOC representatives from Airco's board and removal of Airco representatives from BOC's board. Complete divestiture and removal of BOC and Airco representatives from each other's board of directors will restore BOC as a procompetitive force on the edge of the market and as a likely potential entrant into the United States industrial gases market. The same sanction will also restore BOC as an independent, actual competitor in the inhalation anesthetic equipment and accessories market and in the inhalation therapy equipment and accessories market.

BOC has shown some proclivity toward mergers in the lines of commerce relevant to this proceeding. To insure that the Commission's objective in bringing this proceeding is not circumvented, the Commission should retain jurisdiction over BOC respondents and the authority to approve future acquisitions in the three lines of commerce relevant to this proceeding for a period of ten (10) years. Abex Corp.

v. F.T.C., 420 F.2d 928, 933 (6th Cir. 1970); cert. denied, 400 U.S. 866 (1970); Seeburg Corp. v. F.T.C., 425 F.2d 124, 129 (6th Cir. 1970), cert. denied, 400 U.S. 866 (1970).

The acquisition involved in this proceeding is 4 million shares of Airco stock. Because of a court injunction issued at the behest of the Commission, intermingling of assets of the two corporations has been prevented. F.T.C. v. British Oxygen Co., 1974 CCH Trade Cas. ¶75,003 (D. Del. 1974). Thus, divestiture will not cause undue difficulty to either BOC or Airco. Further, it is possible to get almost immediate relief since the divestiture involves stock only. The order entered herewith will require BOC to set up an independent Voting Trustee which shall have full independent authority to vote said stock until such time as the trusteed stock shall have been divested pursuant to the provisions of this order. Under this arrangement, the vagaries of the financial markets will not prevent some immediate relief.

CONCLUSIONS OF LAW

1. The Commission has jurisdiction of and over the subject matter of this proceeding and of respondents The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited ("BOC respondents"); and respondent Airco, Inc. ("Airco").

2. BOC respondents and Airco were, at all times relevant herein, corporations engaged in commerce, as "commerce" is defined in the Clayton Act, as amended, and in the Federal Trade Commission Act.

3. The appropriate lines of commerce within which to evaluate the competitive effects of the acquisition of Airco stock by BOC are: (a) industrial gases; (b) inhalation anesthetic equipment and accessories; and (c) inhalation therapy equipment and accessories.

4. The proper geographic market within which to determine the competitive effects of BOC's acquisition in the three relevant lines of commerce is the United States, as a whole.

5. The effect of the acquisition of Airco stock by BOC has been, or may be, substantially to lessen competition or to tend to create a monopoly in violation of

Section 7 of the Clayton Act, as amended, and in violation of Section 5 of the Federal Trade Commission Act, in the following ways:

(a) Substantial potential competition between BOC and Airco in the production and sale of industrial gases has been eliminated.

(b) BOC has been eliminated as a significant perceived potential entrant into the production and sale of industrial gases in the United States.

(c) BOC has been eliminated as a significant actual potential entrant into the production and sale of industrial gases in the United States.

(d) The already high concentration in the industrial gases market in the United States may be increased.

(e) Already high barriers to entry of new manufacturers into the production and sale of industrial gases may be raised significantly.

(f) Substantial actual competition between BOC and Airco in the manufacture and sale of inhalation anesthetic equipment and accessories has been eliminated.

(g) Concentration in the manufacture and sale of inhalation anesthetic equipment and accessories has been increased.

(h) Airco, through its Ohio Medical Products Division, has been further entrenched in the manufacture and sale of inhalation anesthetic equipment and accessories.

(i) Barriers to entry of new manufacturers into the manufacture and sale of inhalation anesthetic equipment and accessories may be raised significantly.

(j) Actual competition in the manufacture and sale of inhalation therapy equipment and accessories between BOC and Airco has been eliminated.

(k) Concentration in the manufacture and sale of inhalation therapy equipment and accessories has been increased.

(l) Airco, through its Ohio Medical Products Division, has been further entrenched in the manufacture and sale of inhalation therapy equipment and accessories.

(m) Barriers to entry of new manufacturers into the manufacture and sale of inhalation therapy equipment and accessories may be raised significantly.

6. The acquisition of Airco stock by BOC may be substantially to lessen competition, or to tend to create a monopoly, in violation of Section 7 of the Clayton Act, as amended (15 U.S.C. 18), and in violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. 45).

ORDER

For the purpose of this Order, BOC shall include all subsidiary or related corporations and all successor corporations of The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited; and Airco shall include all subsidiary or related corporations and all successor corporations of Airco, Inc.

I

IT IS ORDERED that BOC, its officers, directors, agents, representatives and employees, shall within one (1) year from the date this Order becomes final, divest itself absolutely and in good faith, subject to the prior approval of the Federal Trade Commission, of all rights, title and interest including without limitation all shares of stock and all assets, properties, rights and privileges, tangible or intangible, including without limitation all plant, equipment, machinery, raw material reserves, inventory, customer lists, trade names, trademarks, good will, and other property of whatever description acquired by BOC as a result of its acquisition of the stock of Airco.

II

IT IS FURTHER ORDERED that none of the stock, assets, properties, rights and priviliges, tangible or intangible, required to be divested by BOC pursuant to Paragraph I above, shall be divested directly or indirectly to anyone who is, at the time of the divestiture, an officer, director, employee, or agent of, or under the control, direction or influence of BOC, or who owns or controls more than one percent of the capital stock of BOC.

III

IT IS FURTHER ORDERED that BOC shall, within sixty (60) days from the date this Order becomes final, transfer to an independent Voting Trustee, subject to the prior approval of the Federal Trade Commission, which shall not be under the direct or indirect control, domination, or influence of BOC, its officers, directors, agents or representatives, all of the stock of Airco presently held by BOC, and BOC shall maintain in existence the voting trust so created, or a successor thereof, until BOC has divested itself of all the stock of Airco in compliance with Paragraphs I and II above.

Said Voting Trustee shall have full independent discretion to vote the trusteed stock and BOC and its officers, directors, agents and representatives may not consult, advise or otherwise participate in any manner except in connection with the sale of the trusteed stock

in accordance with the provisions of Paragraphs I and II above, or the appointment of a successor Voting Trustee.

IV

IT IS FURTHER ORDERED that respondent BOC shall cease and desist for a period of ten (10) years from the date this Order becomes final from acquiring, directly or indirectly, through subsidiaries or otherwise, the whole or any part of the stock, share capital or assets (other than products sold in the normal course of business) of any concern, corporate or noncorporate, engaged at the time of acquisition in any state of the United States in any or all of the business of industrial gases, inhalation anesthetic equipment and accessories, and inhalation therapy equipment and accessories, without the prior approval of the Federal Trade Commission.

The prohibited acquisitions in this paragraph shall include but not be limited to the entering into any arrangement between BOC, and any concern engaged in any or all of the business of industrial gases, inhalation anesthetic equipment and accessories, and inhalation therapy equipment and accessories, or any segment thereof, pursuant

to which BOC obtains the market share of any such concern (a) through such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, under its own trade name or labels and thereafter manufacturing or distributing any of said products under the BOC trade name, or (b) by reasons of such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, and thereafter transferring to BOC its customer lists, or in any other way making available to BOC access to its customers or its customer accounts.

V

IT IS FURTHER ORDERED that BOC notify the Federal Trade Commission at least thirty (30) days prior to any proposed change in the corporate structure such as dissolution, assignment or sale resulting in the emergence of a successor corporation, the creation or dissolution of subsidiaries or any change in the corporation which may affect compliance obligations arising out of the Order.

VI

IT IS FURTHER ORDERED that BOC cease any and all representation on the board of directors of Airco, and cease and desist from taking any steps to nominate, seat, or admit any representatives of Airco to the board of directors of BOC.

VII

IT IS FURTHER ORDERED that BOC shall within sixty (60) days from the date this Order becomes final, and every sixty (60) days thereafter until BOC has fully complied with the provisions of this Order, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which BOC intends to comply or has complied with this Order. All compliance reports shall include, among other things that are from time to time required, a summary of contacts or negotiations with anyone for the specified stock, assets, properties, rights, and privileges, tangible or intangible, the identity of all such persons, and copies of all written communications to and from such persons.

VIII

IT IS FURTHER ORDERED that Airco cease and desist from taking any steps toward achieving union of interest between Airco and BOC, including but not limited to merger, acquisition, consolidation or joint venture in any market referenced herein.

IX

IT IS FURTHER ORDERED that Airco cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of December 10, 1973.

X

IT IS FURTHER ORDERED that Airco cease any and all representation on the board of directors of BOC, and cease and desist from taking any steps to nominate, seat, or admit any representative of BOC to the board of directors of Airco.

XI

IT IS FURTHER ORDERED that Airco shall within sixty (60) days from the date this Order becomes final, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which Airco has complied with this Order.

Ernest G. Barnes
Administrative Law Judge

October 18, 1974

A 852

UNITED STATES OF AMERICA

BEFORE

FEDERAL TRADE COMMISSION

DOCKET NO. 8955

IN THE MATTER OF:

BRITISH OXYGEN COMPANY, LIMITED, et al

ORDER

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

COMMISSIONERS:

Lewis A. Engman, Chairman
Paul Rand Dixon
M. Elizabeth Hanford
Stephen Nye

In the Matter of	)	
BRITISH OXYGEN COMPANY, LIMITED, BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, BRITISH OXYGEN INVESTMENTS, LIMITED and AIRCO, INCORPORATED, corporations.	)	DOCKET NO. 8955

FINDINGS AS TO THE FACTS, CONCLUSIONS AND ORDER

The Federal Trade Commission issued its complaint in this matter on February 26, 1974, charging that respondents, The British Oxygen Company Limited, BOC Financial Corporation, BOC Holdings Limited, and British Oxygen Investments Limited had violated Section 7 of the amended Clayton Act (15 U.S.C. 18) in acquiring 4 million shares of the stock of Airco, Incorporated and further charging these respondents and Airco, Incorporated with violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. 45). Testimony and other evidence in support of and in opposition to the allegations of the complaint were received in evidentiary hearings and in an initial decision of

October 18, 1974, the administrative law judge concluded that the principal charges were supported by the evidence and entered an order that would require divestiture of the acquired firm and other relief.

The Commission, having considered the appeal filed by the respondents and the entire record, and having determined that the law judge's findings of fact and conclusions, as modified herein and as supplemented by the attached Commission Opinion, should be adopted as the findings and conclusions of the Commission, now makes its findings as to the facts, its conclusions drawn therefrom and its order.

1. through 35. With the exception of Finding 18, the Commission adopts the Preliminary Statement and Findings 1 through 36 of the Initial Decision.

36. Finding of Fact 36 of the Initial Decision is revised to read:

The Bureau of the Census classifies the production and marketing of industrial gases as a separate and distinct industry under Standard Industrial Classification (SIC) 2813 (CX 296A-F, CX 312A-K). The United States industrial gases industry has been defined by Census from at least 1945 through the present as those establishments primarily engaged in manufacturing gases for sale in compressed, liquid and solid forms (CX 340A-B, CX 336A-B, CX 338A-B; CX 339A-B, CX 296A). The gases classified by Census as industrial gases are acetylene, carbon dioxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other elemental gases, and compressed and liquified gases (CX 299D, CX 300A-D, CX 312C-D). The same group of gases have been classified as industrial gases by Census since at least 1954 (CX 337A-C).

37. through 52. The Commission adopts Findings 37 through 52 of the Initial Decision.

53. Finding of Fact 53 of the Initial Decision is revised to read:

There is no price data in the record as such. BOC respondents contend that price competition in the industry is extremely rigorous, and reference is made to testimony of industry executives (Dempster 556; Baker 436-37; Flamm 305). This testimony is, however, somewhat equivocal. Mr. Flamm of Linde stated that between Linde,

Air Products and Airco -- "they argue their service is equal, I would say a fair amount of vigorous price competition" (Flamm 305). Further, this testimony, which is of the most general nature, must be viewed in perspective with the supply-demand situation existing during the past 2 years, and testimony that prices have firmed, marginal pricing has disappeared and full pricing has become the standard. Respondents also rely upon the observations in the Perham-Greenfield (BOC) report on the United States industrial gases market as of 1969-1970 (BOC RX 62). The report also covers the period 1969-early 1970. The supply-demand situation and industry pricing practices changed substantially from early 1970 to the end of 1973 when the challenged acquisition occurred (Findings of Fact 50-52).

54. Finding of Fact 54 of the Initial Decision is revised to read:

BOC respondents placed several charts in evidence which demonstrate that average unit value of major industrial gases has declined in recent years (BOC RX 246; BOC PF 123). Conclusions regarding prices have been drawn from data compiled by the Bureau of the Census on the total value and quantity of shipments of the various gases, f.o.b. plant, with the unit value (i.e., the ratio of total value of shipments to total quantity of shipments) used as an approximation of price. Declining unit value has little significance in establishing that the marketplace is highly competitive. The basic pattern in the industry has been an increase in volume purchased by individual customers and a trend toward pipeline delivery. Thus, the increasing use of tonnage oxygen with low delivery costs has had an averaging-down effect on the unit value of shipments. Economies of scale in production and delivery has also effected lower unit costs (Baker 2745-46).

55. through 65. The Commission adopts Findings 55 through 65 of the Initial Decision with the exception that the reference to "BOC RX 254" in the second sentence of Finding 58 should read: "id. Figures 20 and 21."

66. The Commission adopts Finding 66 of the Initial Decision except for the first two sentences thereof.

67. through 80. The Commission adopts Findings 67 through 80 of the Initial Decision.

81. Finding 81 of the Initial Decision is revised to read:

Industry witnesses testified that their pricing and marketing decisions had not been affected by the perceived potential entry of BOC (Flamm 336-37; Dempster 567-68; Kimmerling 881-82; Baker 446).

82. through 91. The Commission adopts Findings 82 through 91 of the Initial Decision, striking the word "Bangladesh" in Finding 85 and changing "19 countries" in Finding 89 to read "17 countries."

92. Finding 92 of the Initial Decision is revised to read:

In October 1969, Dr. Muller was told by the chairman of BOC to terminate all activities other than searching for opportunities for BOC in the U.S. industrial gases field (CX 42, CX 248A-B). In December 1969, the chairman of BOC informed Dr. Muller that BOC should be represented in the United States; the only questions were what, how, when and where (CX 47A).

93. and 94. The Commission adopts Findings 93 and 94 of the Initial Decision, revising the last sentence of Finding 94 to read:

Throughout Dr. Muller's association with BOC, BOC continually stressed its interest in entering the U.S. industrial gases market (CX 42, 47A; Muller 668).

95. The Commission adopts Finding 95 of the Initial Decision, revising the first sentence to read:

By 1969, BOC had made a definite decision to investigate possible entry into a number of U.S. markets, with first priority to be given to the U.S. industrial gases market (CX 40A, CX 246).

96. Finding 96 of the Initial Decision is revised to read:

[Delete subtitle]

In November 1969, Mr. Johnson of Loeb, Rhodes and Company, an investment banking firm, was told by BOC executives that BOC was interested in making an acquisition of some consequence in the United States in the industrial gases line of business.

Mr. Johnson indicated that he had earlier relations with Chemetron that involved negotiations for the acquisition of Chemetron by another company. BOC executives expressed an interest in pursuing possible acquisition of Chemetron. On January 1970, a meeting was arranged between BOC and Chemetron officials. Chemetron's management made it clear that they were interested in permitting BOC to acquire only a minority interest, enough to protect against a takeover by other companies. The BOC representative in turn indicated that he doubted that his board of directors would be interested in anything less than a majority interest. BOC later informed Johnson that it was not interested in pursuing the matter further (CX 223, 224, 225; Tr. 832-35).

97. Finding 97 of the Initial Decision is adopted, deleting the subtitle.

98. Finding 98 of the Initial Decision is revised to read:

[Delete subtitle]

BOC considered Burdett Oxygen Company of Cleveland (Burdett-Cleveland) a possible acquisition candidate in 1969 (CX 40A). In 1969, BOC told Burdett-Cleveland that it might be interested if the company ever wished to dispose of its operations (CX 216). Mr. Perham and Mr. Greenfield of BOC visited Burdett-Cleveland during BOC's 1970 study of the U.S. industrial gases market. Although the authors of the report considered the company to have management problems and to be in financial trouble, they expressed the view that "possibly their strategy in obtaining three tonnage supply schemes could be made to work if the business ever is available at a realistic price... We recommend we watch and wait with only a minor possibility it could be of interest to us" (CX 232 D-E, in camera).

99. Finding 99 of the Initial Decision is revised to read:

Early in 1970, an investment banker told BOC that 50 percent of the stock of Burdett-Cleveland could be purchased for $4-5 million. In April 1970, BOC informed the banker that there was a possibility that BOC could be interested in a majority position in Burdett-Cleveland (CX 233A, CX 234). After BOC was told it was then impossible to obtain control, BOC told the banker that if the situation changed it should be alerted as it might still be interested (CX 243). In September-October 1970, BOC told Burdett-

Cleveland and its bankers that it was interested in buying Burdett's Niagara Falls, New York, industrial gases plant for its Canadian operation across the border. However nothing came of the matter (CX 244A, CX 245).

100.-102. The Commission adopts Finding 100 of the Initial Decision, but vacates Findings 101 and 102.

103.-111. The Commission adopts Findings 103 through 111 of the Initial Decision, but deletes the sentence in Finding 110: "The Brazilian market has a growth rate comparable to the U.S. market."

112. The Commission adopts Finding 112 of the Initial Decision, revising the last sentence to read: "At the time BOC acquired Airco stock, there were a number of small regional U.S. industrial gases producers, some of which presumably were available for acquisition (see, e.g. Tr. 736, 788, 876, 393, 2734-35, 2750, 2781, 260).

113.-121. The Commission adopts Findings 113 through 121 of the Initial Decision, deleting the first sentence of Finding 121.

122. The Commission adopts Finding 122 of the Initial Decision but substituting the following for the first two sentences thereof: "The Z-79 Committee of the American National Institute consists of the leading manufacturers of IAE, representatives of the medical professional societies in the United States and representatives of the Federal Government (Hedley-Whyte 1212-13).

123.-127. The Commission adopts Findings 123 and 124 of the Initial Decision, deleting the first sentence of Finding 124. Findings 125-127 are vacated.

128.-140. Findings 128 through 138 and Finding 140 of the Initial Decision are adopted except for characterizations of sales of IAE as constituting a single market. Finding 139 is vacated.

141.-149. Findings 141 through 149 of the Initial Decision are adopted, except for Finding 143 which is vacated.

Tables I and II in camera of the Initial Decision are adopted by the Commission.

150.-153. Findings 150 through 153 of the Initial Decision are vacated and the following findings are entered in lieu thereof:

Prior to the acquisition of Airco, BOC competed with Airco in the manufacture or sale of anesthesia machines, anesthesia vaporizers and anesthesia face masks. (CX 135-141, 146, 147; 150; Physical Exhibit A, Table I in camera). The manufacture and sale of anesthesia machines, anesthesia vaporizers, and anesthesia face masks is in each of these product lines a line of commerce for purposes of Section 7 of the Clayton Act. BOC's stock acquisition has substantially lessened competition in these lines of commerce.

154.-174. The Commission adopts Findings 154 through 174 of the Initial Decision except to the extent they characterize sales of ITE as constituting a single market.

175.-182. Findings 175 through 182 of the Initial Decision are vacated.

The following Conclusions of the Initial Decision are adopted except as indicated:

Conclusion IA

Conclusion IB

Conclusion IC, except for the last sentence of the first paragraph.

Conclusion ID

Conclusion IE

Conclusion IF (entitled "BOC Exerted Beneficial Influence etc..." at pp. 93-96) is vacated.

Conclusion IF [sic] (entitled "The Acquisition of Airco etc..." at pp. 96-102) is adopted, except that in the first paragraph on p. 100 "17 different countries" is substituted for "19 different countries" and the final sentence is deleted. Further, the third sentence in the second paragraph on p. 101 is deleted and "See Finding 112" is substituted therefor.

Conclusion IG is vacated.

Conclusion IH is adopted.

Conclusion IIA is vacated.

Conclusion IIB is adopted.

Conclusion IIC is vacated.

Conclusion III is vacated and the following is entered therefor: There is insufficient evidence that competition has been lessened in the sale of inhalation therapy equipment as the result of the acquisition.

Conclusion IV is adopted to the extent it is not inconsistent with the Final Order and Opinion of the Commission.

Conclusions of Law at pp. 114-116 are adopted to the extent they are not inconsistent with the Findings and Opinion of the Commission.

The following final order is hereby entered:

FINAL ORDER

For the purpose of this Order, "BOC" shall include all subsidiary or related corporations and all successor corporations of The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited; and "Airco" shall include all subsidiary or related corporations and all successor corporations of Airco, Inc.

I

IT IS ORDERED that BOC, its officers, directors, agents, representatives and employees, shall within one (1) year from the date this Order becomes final, divest itself absolutely and in good faith, subject to the prior approval of the Federal Trade Commission, of all rights, title and interest including without limitation all shares of stock and all assets, properties, rights and privileges, tangible or intangible, including without limitation all plant, equipment, machinery, raw material reserves, inventory, customer lists, trade names, trademarks, good will, and other property of whatever description acquired by BOC as a result of its acquisition of the stock of Airco.

II

IT IS FURTHER ORDERED that none of the stock, assets, properties, rights and privileges, tangible or intangible, required to be divested by BOC pursuant to Paragraph I above, shall be divested directly or indirectly to anyone who is, at the time of the divestiture, an officer, director, employee, or agent of, or under the control, direction or influence of BOC, or who owns or controls more than one percent of the capital stock of BOC.

III

IT IS FURTHER ORDERED that respondent BOC shall cease and desist for a period of ten (10) years from the date this Order becomes final from acquiring, directly or indirectly, through subsidiaries or otherwise, the whole or any part of the stock, share capital or assets (other than products sold in the normal course of business) of any concern, corporate or noncorporate, engaged at the time of acquisition in any state of the United States in any or all of the business of (1) industrial gases, or (2) anesthesia machines, or (3) anesthesia vaporizers, or (4) anesthesia face masks, without the prior approval of the Federal Trade Commission. The foregoing restriction (1) shall not apply to the acquisition of a concern which in the two most recent reporting years prior to the acquisition has reported value of shipments of industrial gases (SIC 2813) to the Bureau of Census not in excess of $25 million in the aggregate in each of the two years; provided, however, that BOC has not already acquired any interest in a concern engaged in any portion of the business of manufacturing or selling industrial gases in the United States and no longer retains an ownership interest in Airco at the time of such acquisition.

The prohibited acquisitions in the above paragraph shall include but not be limited to the entering into of any arrangement between BOC, and any concern engaged in any or all of the aforesaid businesses pursuant to which BOC obtains the market share of any such concern (a) through such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, under its own trade name or labels and thereafter manufacturing or distributing any of said products under the BOC trade name, or (b) by reasons of such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, and thereafter transferring to BOC its customer lists, or in any other way making available to BOC access to its customers or its customer accounts.

IV

IT IS FURTHER ORDERED that BOC notify the Federal Trade Commission at least thirty (30) days prior to any proposed change in the corporate structure such as dissolution, assignment or sale resulting in the emergence of a successor corporation, the creation or dissolution of subsidiaries or any change in the corporation which may affect compliance obligations arising out of the Order.

V

IT IS FURTHER ORDERED that BOC cease any and all representation on the board of directors of Airco, and cease and desist from taking any steps to nominate, seat, or admit any representatives of Airco to the board of directors of BOC.

VI

IT IS FURTHER ORDERED that BOC shall within sixty (60) days from the date this Order becomes final, and every sixty (60) days thereafter until BOC has fully complied with the provisions of this Order, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which BOC intends to comply or has complied with this Order. All compliance reports shall include, among other things that are from time to time required, a summary of contacts or negotiations with anyone for the specified stock, assets, properties, rights, and privileges, tangible or intangible, the identity of all such persons, and copies of all written communications to and from such persons.

VII

IT IS FURTHER ORDERED that Airco cease and desist from taking any steps toward achieving union of interest between Airco and BOC, including but not limited to merger, acquisition, consolidation or joint venture in any market referenced herein.

VIII

IT IS FURTHER ORDERED that Airco cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of December 10, 1973. The foregoing provision shall not apply (1) to Airco's right of first refusal as set forth in paragraph 4 of the December 10, 1973 agreement, subject, however, to Commission final approval of the exercise of that right; (2) to the restrictions on dissemination of information contained in the July 25, 1973 agreement.

IX

IT IS FURTHER ORDERED that Airco cease any and all representation on the board of directors of BOC, and cease and desist from taking any steps to nominate, seat, or admit any representative of BOC to the board of directors of Airco.

X

IT IS FURTHER ORDERED that Airco shall within sixty (60) days from the date this Order becomes final, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which Airco has complied with this Order.

By the Commission.

S E A L

Charles A. Tobin,
Secretary

ISSUED: December 8, 1975

UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

COMMISSIONERS:

Lewis A. Engman, Chairman
Paul Rand Dixon
M. Elizabeth Hanford
Stephen Nye

In the Matter of	)	
BRITISH OXYGEN COMPANY, LIMITED BOC FINANCIAL CORPORATION, BOC HOLDINGS, LIMITED, BRITISH OXYGEN INVESTMENTS, LIMITED and AIRCO, INCORPORATED, corporations.	)	DOCKET NO. 8955

OPINION OF THE COMMISSION

By Engman, Commissioner:

This is an appeal by all respondents from an Initial Decision by Administrative Law Judge Ernest G. Barnes.

The British Oxygen respondents appeal his ruling that they violated Section 7 of the Clayton Act in acquiring approximately 35 percent of the outstanding shares of common stock in respondent Airco. 1/ There appears to be no dispute that 35 percent gives BOC effective control of Airco.

1/ Airco also appeals that ruling, joining in the British Oxygen companies' briefs. The British Oxygen respondents are represented by common counsel and will be collectively referred to as BOC. The corporate relationships between the BOC respondents are described in Findings 6-8. Airco is sometimes referred to in the record by its previous name, Air Reduction Company.

The Administrative Law Judge also found that certain agreements between BOC and Airco relating to the acquisition violated Section 5 of the Federal Trade Commission Act and both BOC and Airco appeal that ruling.

Prior Proceeding

In December 1973, BOC acquired 4 million shares, or 35 percent, of the outstanding common stock of Airco by means of a public tender offer. On February 26, 1974, two months after the acquisition, the Commission issued a complaint charging that BOC's acquisition violated the antitrust laws. On the same day the Commission applied to a United States District Court for a temporary restraining order and a preliminary injunction requiring BOC to maintain Airco as a separate entity and restraining it from, among other things, voting its Airco stock, having BOC personnel serve on the Airco board, increasing or decreasing its holding of Airco stock, and exchanging trade secrets with Airco pending disposition of the Commission's complaint.

On March 8, 1974, the District Court issued a preliminary injunction requiring BOC, among other things, to maintain Airco as a separate company. The court declined to enjoin BOC from voting its Airco shares or having BOC personnel serve on the Airco board. The injunction was conditioned on the Commission expediting its administrative proceeding. FTC v. British Oxygen Co., 1974-1 Trade Cases ¶75,003 (D. Del. 1974), appeal by Airco docketed, No. 74-1492, 3rd Cir. May 20, 1974.

During hearings on the complaint which were commenced on May 6, 1974, some 28 witnesses were called and several thousand pages of documentary exhibits were received into the record. On October 18, 1974, the Administrative Law Judge issued his Initial Decision sustaining the major allegations of the complaint. Motions by all the parties for extensions of time to file appeal briefs were granted by the Commission. Oral argument on the appeals was heard by the Commission on April 30, 1975.

The Respondents

British Oxygen Company is a publicly-held United Kingdom company with its main office in London. A principal part of its business is the production and sale of industrial gases, not only in the British Isles but in some 18 other countries. At the time of the acquisition it was the second largest industrial gases firm in the world. BOC also produces and sells equipment for the manufacture and storage of certain gases at extremely low temperatures (cryogenic equipment), welding and cutting equipment, medical equipment, chemicals, metals, vacuum engineering and some consumer products. In its fiscal year ending September 30, 1973, BOC had total sales of about $766 million, approximately half of which were derived from operations in the United Kingdom and the balance chiefly from countries that were formerly parts of the British empire.

Airco, Incorporated is a publicly-owned New York corporation with its principal office in Montvale, New Jersey. It manufactures industrial gases and medical products, which account for about 35% of total sales. Airco also makes and sells welding and cutting equipment, cryogenic equipment, metals and specialized metal products, medical gases, and high vacuum equipment. It operates gases plants in 22 locations scattered throughout the United States. It is the third largest producer of industrial gases in the United States. Through its Ohio Medical Products Division it also engages in the sale of inhalation anesthetic equipment and inhalation therapy equipment. Its sales of inhalation anesthetic equipment exceed those of any other company in the United States. In 1973 Airco had net sales of $584 million and net income of approximately $19 million.

BOC's Acquisition of an Interest in Airco

BOC acquired its interest in Airco in late December 1973 in the context of a competing tender offer for Airco stock.

During 1973 Airco's stock had been selling at its lowest prices in over five years. In June 1973 BOC learned of rumors of an impending tender offer for Airco stock and the managing director of BOC discussed Airco's vulnerability to such a tender offer with a vice president of Airco. BOC also implemented a study of the possibility of BOC's acquiring Airco by a tender offer.

Later that month, the president of Airco met with the board chairman of BOC and proposed an amalgamation between BOC and Airco. Subsequently, on July 25, 1973, BOC and Airco entered into a written agreement that provided for the exchange of confidential financial information and contained a provision that neither company would make any offer for a period of 5 years to acquire any securities of the other without the prior approval of the other company's board of directors. Meetings exploring an amalgamation between the two companies were held during September and October.

In November 1973, the Curtiss-Wright Corporation suddenly informed Airco that it was prepared to make a tender offer for 2 million Airco shares at $16-17 per share. After consideration of the proposal and a study of the Curtiss-Wright company, the Airco board of directors decided to oppose any such tender offer. On December 3, 1973, Curtiss-Wright made a public tender offer for 2.4 million shares of Airco stock at $18 per share. Airco's board recommended to Airco's shareholders that they not accept it and asked them to wait to consider possible alternatives to that offer.

Shortly thereafter, BOC and Airco entered into an agreement in which Airco consented to BOC making a tender offer for Airco shares. The agreement provided for reciprocal representation by BOC and Airco on each other's board of directors. Additionally, the agreement provided that Airco would have first right to purchase or to designate a purchaser for any Airco shares purchased by BOC should BOC subsequently decide to sell.

On December 10, 1973, BOC made a tender offer to buy up to 4 million shares of Airco stock at $20 per share. Airco's board informed Airco's shareholders that it did not oppose the offer and advised them that a closer association of Airco and BOC would be beneficial.

The BOC tender offer was oversubscribed and the shareholders who tendered to BOC had their tenders pro-rated. The cost to BOC of purchasing the 35 percent interest in Airco was $80 million plus $2.8 million in expenses. Subsequently Airco's board of directors was enlarged from 12 to 16 directors to provide for four representatives of BOC.

The Complaint

The Commission's complaint charges that the acquisition may substantially lessen competition in industrial gases, inhalation therapy equipment, and inhalation anesthetic equipment, and submarkets thereof. 2/ The case was tried on the theory that BOC's acquisition of controlling interest in Airco substantially lessened potential competition in the U.S. industrial gases industry by eliminating BOC as the most likely potential entrant into that market, and that actual competition between Airco and U.S. subsidiaries of BOC in the inhalation anesthetic equipment and inhalation therapy equipment was eliminated. The ALJ sustained these charges and an additional charge that the July and December agreements between BOC and Airco, paving the way for the BOC tender offer, violated Section 5 of the Federal Trade Commission Act. He issued an order requiring BOC to divest its holdings of Airco stock and Airco to cease and desist from taking any steps to implement any provision of the agreements with BOC.

2/ The complaint also charged that the acquisition lessened competition in medical pipeline systems, electrical welding equipment, and gas welding and cutting equipment. These allegations were abandoned by complaint counsel early in the proceeding.

I. INDUSTRIAL GASES

"Industrial gases" are recognized as consisting of those gases, except for common fuel gases, sold in compressed or liquid (and sometimes solid) form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof. The term "industrial gases industry" is commonly used to refer to a distinct group of manufacturers who produce the principal atmospheric gases (oxygen, nitrogen, argon) and acetylene and who may produce or purchase for resale the other mentioned gases. Sales by industrial gases firms are direct or through distributors to other manufacturers, welders, contractors and other users.

The industrial gases industry has two major marketing segments; tonnage and merchant. "Tonnage" refers to supplying a single customer where demand at a particular plant location justifies the construction of a "tonnage" or "on-site" plant near that location. The gas is delivered through a pipeline, with many tons of gas delivered a day. Steel companies are typical tonnage users of oxygen. Tonnage plants are commonly owned and operated by industrial gases companies with output sold under long-term contracts. However, some customers own and operate a plant which has been built for them ("turnkey" plants). The only gases which are produced and sold on a tonnage basis are oxygen, nitrogen and hydrogen.

"Merchant" refers to sales of gases in smaller quantities. The gas is transported to the customer either in gaseous form in cylinders or as bulk liquid. The larger quantities are shipped as bulk liquid under reduced temperatures. Plants used to supply gases to customers in either liquid form or in cylinders are referred to as merchant plants. It is common, however, for on-site tonnage plants to have merchant capacity. A gases company building a tonnage plant for itself will often construct excess capacity, sell the excess in the merchant market, and benefit from the economies of scale which would otherwise not be available. Gases distributed into the merchant market, including gases coming from incremental production in tonnage plants, are sold at prices that are as high as eight or nine times the price of tonnage gas.

It is important to note that the production and handling of bulk liquid gases requires highly technical skills and special equipment designed to withstand extremely low temperatures. The equipment is specialized and used almost exclusively in the industrial gases industry.

A. Relevant Market

The ALJ found that the relevant product market is the production and distribution of industrial gases by industrial gases companies. Included are all gases sold by industrial gases firms including resale of gases purchased from companies who produce them as by-products. Because individual gases are utilized for different purposes, have different prices, and there is no cross-elasticity of production facilities except among the atmospheric gases, respondents contend that the ALJ erred in treating them all as part of one line of commerce. However, we agree with his reasoning and conclusions.

There is no doubt that each of the individual gases listed in the complaint could constitute a separate product market since most gases have specialized end uses. However, lack of interchangeability in use does not automatically bar recognition of a broader line of commerce encompassing such products where, for technological or other reasons, there is commonality in production and distribution resulting in a distinct and recognized "industry" of firms who sell a broad line of such products. U.S. v. Grinnell Corp., 384 U.S. 563 (1966). U.S. v. Bethlehem Steel Corp., 168 F. Supp. 576, 594 (S.D.N.Y. 1958); U.S. v. Ford Motor Co., 286 F. Supp. 407, 411-416 (E.D. Mich. 1968), aff'd, 405 U.S. 562 (1972); Cf. Sterling Drug, Inc., 80 FTC 477 (1972).

Industrial gases companies typically either produce or distribute a broad range of gases. They do this in order to provide their customers and dealers in the merchant market with a full or nearly full line of gases because many buyers prefer to order and get delivery from one gases supplier. Also the technical skills used in production, are very similar for many gases. For example, oxygen, nitrogen and argon are all produced in identical air separation plants, generally by a highly technical cryogenic process. Gases produced in such plants accounted for over 63 percent of the total value of all industrial gas shipments by primary manufacturers

in the United States in 1972. The skills and technical capability for storing and transporting are also similar for many of the industrial gases. Oxygen, nitrogen, argon, helium, carbon dioxide, and hydrogen are commonly transported and sold to distributors in bulk liquid form in special tank cars or trailers.

This type of synergetic marketing relationship is not unlike the "cluster of products and services" offered in response to "settled consumer preferences" which the courts have held set "commercial banking" apart as a separate line of commerce. U.S. v. Philadelphia National Bank, 374 U.S. 321 (1963); U.S. v. Connecticut National Bank, 418 U.S. 656 (1974). See also U.S. v. Grinnell Corp., supra 384 U.S. at 573-74 (1966). The industrial gases companies are recognized in the trade as a distinct industry and are represented by two trade associations. It was entry into the "U.S. industrial gases market" that BOC had studied and considered prior to its acquisition of Airco, not simply the production of one industrial gas or a limited group of gases.

BOC also challenges the ALJ's finding that the United States as a whole is the appropriate "section of the country" or geographic market in which to measure any adverse effects of the loss of BOC as a potential entrant. Although most industrial gases are sold and distributed in regional markets of a few hundred miles distance from the point of manufacture, it is appropriate to use the nation as a whole as the section of the country affected by the merger. To begin with, BOC was interested in becoming a nationwide competitor in this country's industrial gases industry and did not limit its studies or merger discussions to one particular area or region. As is apparent from the evidence discussed later in this opinion, the interest evinced by BOC in some regional firms was whether they would constitute feasible footholds for subsequent building of a national company. Airco, the company it eventually acquired, was engaged in the industrial gases business throughout the nation. This clearly was a factor in BOC's decision to acquire it (Tr. 1732-37).

In FTC v. Procter & Gamble Co., where Procter & Gamble, a potential entrant into household liquid bleaches, acquired Clorox, an established nationwide seller of that product, the Commission and the courts found it appropriate to use national sales and concentration

data even though liquid bleach was distributed within a range of only 300 miles from the point of manufacture, 63 FTC 1467, 1537, 1561 (1963), vacated, 358 F. 2d 74 (6th Cir. 1966), rev'd, 386 U.S. 568, 571 (1967). In U.S. v. Marine Bancorporation, 418 U.S. 602, 622 (1974) the Court held that "in a potential-competition case...the relevant geographic market or appropriate section of the country is the area in which the acquired firm is an actual, direct competitor." See also U.S. v. Pabst Brewing Co., 384 U.S. 546 (1966); U.S. v. Bethlehem Steel Corp., supra; and Kennecott Copper Corp. v. FTC, 467 F. 2d 67, 71 (10th Cir.) cert. denied, 416 U.S. 909 (1974), where national "markets" were considered as appropriate alternatives to regional markets.

Furthermore, the record shows that in an important segment of the industrial gases business, namely tonnage gases, the leading gases companies (including Airco) compete on a national basis in submitting bids for the construction of on-site plants. Such nationwide competition among leading firms in the industry in an important segment of the business is in itself a sufficient basis for finding that the country as a whole is a relevant market area. U.S. v. Grinnell Corp., supra, 384 U.S. at 575 (1966).

We conclude that the sale of industrial gases by U.S. industrial gases firms constitutes the appropriate market for the purpose of examining the effects of this acquisition.

B. Concentration

The U.S. industrial gases industry is highly concentrated. As indicated in the following table which shows 1972 market shares of leading firms based on f.o.b. plant selling value of shipments by all U.S. manufacturers classified in the industrial gases industry by the Bureau of Census, the top four firms accounted for approximately 70 percent of production and the top eight firms for over 80 percent: 3/

3/ Some of the individual firm data in the following tabulation were given in camera treatment at the hearing. In view of the fact that the information is now nearly three years old, no competitive harm should result from its disclosure and we have decided to take it out of in camera status. See also §3.45 of the Commission's Rules of Practice.

INDUSTRIAL GASES MARKET SHARES, 1972

Company	Value of Shipments ($1,000)	Market Share 4/	Source
Union Carbide (Linde)	153,000	25.71	Tr. 221
Air Products and Chemicals	106,976	17.98	CX 325-A
Airco	93,577	15.73	CX 325-A
Chemetron	60,496	10.17	CX 325-A
Liquid Air	33,500 5/	5.63	CX 325-A
Liquid Carbonic	29,651	4.98	CX 325-A
Big Three	24,699	4.15	CX 325-A
Burdett (Cleveland)	12,680	2.13	CX 325-A
Total	514,579		
Census 4/	595,000		CX 296-A
Top Four Concentration	414,049	69.59	
Top Eight Concentration	514,579	86.47	

4/ Based upon value of shipments of industrial gases produced by plants classified as in the industrial gases industry.

5/ Pro forma; includes value of shipments of two industrial gases companies acquired effective December 31, 1972 (CX 335-P, Tr. 516).

Furthermore the ALJ found that from 1967 to 1972 there was an increase in concentration in the U.S. industrial gases market. Four-firm concentration increased from 67 percent to 70 percent and eight-firm concentration increased from 84 percent and 86.5 percent between those years. 6/

BOC disagrees with the size of the market used in measuring the foregoing market shares and trends. Its arguments can be subdivided into three areas:

(1) the exclusion of the production of helium by the Federal Government,

(2) the exclusion of the production of atmospheric gases in air separation plants owned by backward-integrated firms,

(3) finally, BOC objects to the inclusion of tonnage gases sold pursuant to long-term contracts.

We find no merit in any of these objections.

6/ It is true as BOC points out, and as is conceded in the Initial Decision, that concentration ratios reported for 1967 by Census in BOC RX 72F are not strictly comparable with 1972 data. Shipments included in 1967 ratios (both in the numerator and the denominator) but not included in 1972 data are products other than industrial gases ("secondary" products) shipped by plants classified in the industrial gases industry, and resales, and various miscellaneous receipts. But if one assumes that the percentage of total resales, secondary product shipments and miscellaneous receipts accounted for by the four largest firms remained fairly constant between 1967 and 1972--a reasonable assumption we think--then the figures are comparable.

BOC has proffered other calculations in an attempt to show a decline in concentration. (Reply brief pp. 14-15 and references cited therein.) However these tabulations are based in whole or in part on market definitions (universe figures) which include inter-plant production and consumption of industrial gases by establishments that are not classified as industrial gases establishments. Since we have determined that such production and consumption are not within the relevant market (infra), these calculations do not have any probative force.

The ALJ excluded all helium produced in government-owned plants. BOC challenges this exclusion, pointing out that one-half of all helium produced and sold is derived from government plants. However, the ALJ was clearly correct in not counting this production since the government does not sell its helium in the open market but sells it to industrial gases companies who purify it and resell it as part of their total marketing package. Such resales by industrial gases firms were included within the ALJ's market.

There are instances of backward integration into industrial gases, primarily by steel companies supplying their own oxygen from air separation plants. It is true that to the extent that such vertical integration occurs, the demand for oxygen from industrial gases firms is reduced pro tanto. But that is not equivalent to producing gases for sale in the marketplace. The vertically integrated firms utilize the gas they produce only for their internal manufacturing processes. Any excess gases which they do market are sold to the industrial gases firms, and not in competition with them or their distributors.

It is true that in U.S. v. Aluminum Co. of America, 148 F. 2d 416, 424 (2d. Cir. 1945) the Court agreed with the government that the extent of Alcoa's "control of the aluminum market" could be measured by examining not only Alcoa's sale of ingot aluminum, but also the consumption of ingot in its fabricating plants. But the Court did not hold that such a broader market was the only appropriate market, as BOC contends. Alcoa was virtually the sole supplier of ingot to nonintegrated fabricators of products (sheet, foil, rod, bar), that Alcoa also produced. The fact that Alcoa was in competition with its customers and could impose, as it did at times, a cost-price squeeze was an important element of the monopolization case against it. The vertical integration of Alcoa played a qualitatively different role in aluminum industry compared with the backward integration of industrial gases users. The exclusion of "in-house" production and consumption from the relevant market was proper here and is in accordance with several prior Section 7 cases. See, e.g., U.S. v. Greater Buffalo Press, Inc., 327 F. Supp. 305, 309 (W.D.N.Y. 1970), dismissal reversed and remanded 402 U.S. 549, 555 (1971); Avnet, Inc. 82 FTC 391, 451-54 (1973), aff'd. 511 F. 2d 70 (7th Cir.), cert. denied (Oct. 6, 1975). Even if such production were included within the relevant market, four-firm concentration would exceed sixty percent and Airco's share would approximate 14 percent (Finding 62). The change is not so substantial as to cause a different result in this case.

BOC argues that if production by backward-integrated steel firms is not to be included, then the Initial Decision should not have included any of the gases produced in tonnage plants owned by industrial gases companies since they are committed under long-term supply contracts and are not available for sale in the open market. It contends that as in U.S. v. General Dynamics Corp., 415 U.S. 486 (1974) market shares computed on such a basis "do not represent the exercise of [present] competitive power but rather the obligation to fulfill previously negotiated contracts at a previously fixed price." Id. at 501.

However we see no error in including gases produced in tonnage contracts pursuant to long-term contracts. Nor do we agree that it leads to a logical dilemma. Gases produced for both tonnage users and merchant users are often produced at the same plant using the same facilities. In General Dynamics, the acquired company had diminished ability to compete for new business because most of its coal deposits--a limited resource found only on certain lands--were previously committed. Past production figures were not indicative of future capability; hence it was error, the Court held, to use market shares based on past production rather than on what coal reserves were available for future contracts. In contrast, the industrial gases companies have virtually unlimited natural resources to produce gases. The principal gases are literally made out of thin air. Since an industrial gases firm is always able to compete for new business from an existing plant or by building a new plant, the past record of these firms in selling tonnage gases is a reasonable indicator of their future ability to compete for new accounts.

C. Barriers to Entry

The Administrative Law Judge found, and BOC does not dispute, that there are substantial barriers for entry into the industrial gases business. To begin with, substantial capital is needed for production plants which cost $7 or $8 million to build. Larger plants cost up to $16 million. With costs of new plant construction being higher today than in previous years, a new entrant would suffer a cost disadvantage insofar as competing in areas (at the same geographical distance to principal customers) that are supplied by established plants.

Experience and a reputation for technical proficiency is undoubtedly a considerable advantage that established firms have over new entrants. Cryogenic facilities which produce atmospheric gases are operated at low temperatures and can be hazardous to employees and surrounding community if misoperated. Lack of familiarity with cryogenic technology has been suggested as a reason why many steel companies prefer to have on-site plants operated by industrial gases firms rather than by themselves. Entry on a multi-plant basis is also viewed as desirable if one or more plants are to serve tonnage customers. If one gases plant should have to be closed down for repairs, the supplier would then have an emergency back-up facility to provide bulk liquid gases to the tonnage customers. 7/

7/ To some extent independents may solve this problem in the merchant market by canvassing other gases companies for temporary supply, and it is common practice for the major firms to exchange gases among themselves when one lacks merchant supply (CX 44-Z-37; CX 232-T; BOC RX 62-I; Tr. 1934; Tr. 2011-12).

D. Elimination of BOC as a Future Entrant

As the principal basis for his decision that the acquisition will likely lessen competition in the U.S. industrial gases industry, the ALJ found that BOC was a potential entrant into the U.S. market and that by acquiring Airco--a leading firm already in the market--BOC eliminated the beneficial effects that would result from a competitive form of entry. 8/

We agree. Except for a toehold-acquisition entry by another large international industrial gases firm in 1968, in recent years there has been no significant entry into the U.S. market, which has been

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8/ The ALJ also found that BOC's position in the fringe of the U.S. industrial gases market itself exerted a procompetitive influence (I.D. pp. 95-96). Presumably, the ALJ had in mind that firms in a concentrated market will sometimes limit their prices and profit margins to forestall new entry. See U.S. v. Falstaff Brewing Corp., 410 U.S. 526 (1973); Bain, Barriers to New Competition (1956). No showing of such effect was made here. In fact, several executives of leading firms testified that although they viewed BOC as the most likely firm to enter the market, BOC had no effect on their prior pricing decisions. Presumably during the time Federal price ceilings were in effect, BOC's position as a possible entrant would have had no additional restraining influence on prices in any event. The record is not clear, however, that the witnesses' testimony was limited to that period. In any event, the finding of actual influence on prices cannot stand.

The ALJ also found that the acquisition increased entry barriers (I.D. p. 103). Although it is difficult to resist the thought that this acquisition--which created the world's largest consortium in industrial gases-- may further deter new entry, there was no inquiry into such questions during the hearing. Consequently we will also vacate this finding. Missouri Portland Cement Co. v. Cargill, Inc., 498 F. 2d 851, 865-66 and n.32 (2d Cir. 1974); Beatrice Foods Co., 81 FTC 481, 534-35 (1972).

dominated by three firms, one of which is Airco. As to possible future entry, industry executives were of one of two views--either there will be no further substantial entry into the U.S. market, or there could be entry by BOC or possibly two or three other large international firms. Only these firms were viewed as having the know-how and experience to surmount the difficulties confronting a would-be entrant. Of those who adhered to the latter view--and this included executives of the two leading industrial gases firms in the United States--all agreed that BOC was the most likely of this small group to enter the U.S. market (Tr. 250, 335, 393, 445-46, 564-68, 594, 876-878). Testimony by BOC executives as well as BOC documents confirm these objective assessments as they show that BOC by 1969 believed it should be represented in the United States, particularly in industrial gases, its primary business. As BOC's chairman phrased it, only a strategy of what, how, when, and where was lacking (CX 47). By stepping into Airco's shoes, BOC virtually removed any prospect that any major future procompetitive entry would ever occur in this industry. 9/

Not only did the acquisition remove whatever prospects existed that BOC would eventually enter the U.S. market by internal expansion or its equivalent, i.e., elimination of "actual entry" effects, but it removed BOC's presence on the fringe of the market which might in the future have had some disciplining effect on U.S. market prices. Although there is no evidence of such disciplining effect in the past, if present trends continue and supply becomes tight, leading firms may coordinate pricing decisions and areas of specialization (infra pp. 35-36). The possibility of entry by BOC may become a factor to be reckoned with. "The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be a substantial incentive to competition which cannot be underestimated." U.S. v. Penn-Olin Chemical Co., 378 U.S. 158, 174 (1964). See also concurring opinions in U.S. v. Falstaff, supra, 410 U.S. at 538-39, 560 n.15.

9/ Cf. Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," 78 Harv. L. Rev. 1313, 1384-85 (1965):

> "In this situation ['a market in which entry barriers for all but a small group of firms are too high'] the only significant hope for making the market in question more competitive, apart from radical technological changes or the development of new substitutes, lies in new entry by one or more of those firms for whom entry barriers are not prohibitive. Loss through merger of one of a limited group of potential entrants thus reduces the prospects of future deconcentration."

BOC's Incentives for Entry into the U.S. Market. The acquisition of Airco was motivated primarily by a desire to expand BOC's ever widening international operations and gain exposure to United States technology. 10/ BOC's board chairman characterized the United States market as the "most powerful and largest in the world [which] must be of continuing interest to any company which has ambitions to act internationally" in the industrial gases business. 11/

10/ There is no claim here that the acquisition was undertaken solely to effect "financial" relationships such as tax savings, earnings-per-share gains via favorable price-earnings differences, or "improved" performance through use of pooling-of-interest accounting methods--motives which have inspired many "conglomerate" mergers. See Bureau of Economics, Federal Trade Commission, Economic Report on Corporate Mergers ch. 2 (1969); Steiner, Mergers: Motives, Effects, Policies (1975).

11/ He stated:

> "[T]he American market, partly as a result of its size, is the source of much technology, much new development, and we [BOC] have to be in tune with that" (Tr. 1728).
>
> "The first reason [for acquiring stock in Airco] is that we have always been interested in the industrial gas market of America. While there is no virtue attached to the claim of being an international company; there are nevertheless benefits which can be obtained by being an international company, and quite clearly, those benefits are diminished if we don't have a position in North America" (Tr. 1844).

The managing director of BOC also confirmed the general desire of BOC to enter the United States industrial gases market (Tr. 2658-59).

Although BOC started its gases business in the British Isles, it has expanded into some 17 countries, including such industrialized nations as Australia, South Africa, Canada, India, Pakistan, Italy, and Brazil. All of these were either de novo or toehold acquisition entries. At the time of the acquisition, BOC was the second largest producer and marketer of industrial gases and related equipment in the world, with sales of those products estimated at nearly $400 million in 1973 (CX 76K). BOC regarded the United States as being the most important and most advanced industrial gases market in the world and one that still enjoys a respectable growth rate (CX 36 A-B, CX 47-A, Tr. 2000-01).

It is interesting to note that in 1969, when BOC management first commenced long range studies of U.S. market, it was emphasized that making profits from a U.S.-based operation was not the primary goal: "Despite the very large size of markets in the USA, the main purpose of a series of BOC ventures over the next, say, five to ten years would be commercial, managerial and technical 'exposure' rather than for the sake of the business itself" (CX 38-E). After the acquisition of controlling interest in Airco, BOC's chairman informed his company's shareholders that the acquisition enabled BOC to pursue its "long-term objectives." He viewed the Airco transaction as offering BOC the opportunity to enter on a national scale "in one jump" as compared to a series of slower, more expensive (and more pro-competitive) steps (Tr. 1736).

Ability of BOC to Expand Into the U.S. Market. BOC does not dispute that it had the financial, technological and business ability to expand into the U.S. market (Tr. 237-38). BOC had an established world-wide reputation and had gained American business experience by participating in the manufacturing and selling of air separation plants in the United States through a joint venture with Airco from 1967 through 1971.

Uniqueness of BOC's Status as a Potential Entrant. Aside from BOC, the only other firms named by any members of the industrial gases industry as possible entrants into the U.S. market were Messer Greishiem and Linde A.G., both German firms, and AGA of Sweden. They were not, however, considered by American firms to be very strong candidates for entry, a view that BOC shared (CX 76L). Linde A.G. is primarily a manufacturer of industrial gases manufacturing equipment for sale to producers and lacks experience in the distribution end of the gases business. 12/ Messer Greishiem does not have the reputation in the industry that BOC possesses (e.g. Tr. 721-22). AGA of Sweden was viewed by some as having the technological prerequisites for entry, but BOC and others felt this firm lacked the financial ability to enter the U.S. market (Tr. 1760, CX 76L).

Contrary to BOC's contentions, none of the companies in the United States which operate air separation plants for their own use, or buy large quantities, is considered a likely potential entrant into the business of selling industrial gases on the open market. None has successfully entered the market in the past and any excess oxygen or other gases they produce they sell to industrial gases firms. Industry witnesses who testified in this proceeding did not consider them to have the required marketing expertise and capability needed to make them likely prospects for distributing industrial gases in the merchant market (Tr. 346, 443-44, 564-65, 2743-44). 13/

12/ Linde A.G. sells air separation equipment in the United States, but does not manufacture and distribute gases in this country. (Linde A.G. is not affiliated with the Linde division of Union Carbide). We have also examined the in camera material which BOC has requested us to consider (BOC RX 235 in camera; Tr. 2065-69) and do not find that it detracts from the evidence that BOC was the most likely entrant into the U.S. market.

13/ BOC's own study of the U.S. market in 1970 confirmed this view in a section entitled "Customer Ownership of Plant:"

> "At one stage it was thought possible that the giant petrochemical complexes would own their own air separation units and perhaps sell surplus to the majors. We were informed that they were persuaded not to follow this route, largely by Linde Division who emphasized the need for back-up supplies, etc. A.D. Little do not believe that customer ownership will be of any significance in the future." (BOC RX 62-K).

That technical expertise and marketing experience in industrial gases are not easy to come by, but are prerequisites for successful entry, is demonstrated by the unsuccessful attempt of Standard Oil of New Jersey (now Exxon) to enter the market by acquiring American Cryogenics, a West Coast producer of industrial gases. Standard's experience was not in the industrial gases field and it eventually sold American Cryogenics to an affiliate of L'Air Liquide--a world-wide French industrial gases firm. At the time of the sale (1968), American Cryogenics was losing $4 million a year on sales of $20 million. L'Air Liquide has subsequently been able to turn the company (Liquid Air in its present name, see p. 10 supra) into a profitable and aggressive operation--a fact of which BOC was aware.

BOC also argues that the Initial Decision ignores the potential competition represented by the smaller industrial gases firm already doing business in some, but not all, of the regional markets within the United States. The difficulty with this line of argument is that unlike BOC, these firms do not constitute major potential competition to the United States market as a whole and the "Big Three" national firms that dominate the U.S. industry.

Interests Shown by BOC Regarding Entry in the United States Industrial Gases Market Since 1970. Although BOC concedes that it had strong desires and incentives to enter the U.S. market, it contends that a study of the U.S. industrial gases market conducted in 1969 convinced its management that there was no feasible means to enter. It submits that the Commission should therefore find that BOC would not have entered the U.S. market but for the "unique opportunity" provided by Airco.

In 1969 BOC's directors decided to make an on-site study of the American industrial gases market to consider "whether there are any identifiable opportunities in USA which BOC might wish to exploit at some future date" (BOC RX 181 C). BOC assigned Allan Perham, chairman of Canox (BOC's Canadian industrial gases subsidiary) and I. Greenfield, a London staff man, to make the study. Together they interviewed people familiar with the U.S. industrial gases industry and completed a report in the early part of 1970.

BOC relies on the report's conclusion that "based on the BOC requirement of 15% pre-tax return on capital employed there is today no case for entering the USA industrial gas market as a producer for either on-site supply or merchant requirements" (BOC RX 62B). 14/ Since there is testimony that the report was accepted by the BOC top management committees and Board of Directors, BOC contends that the Perham-Greenfield report virtually closed the door on the United States for BOC.

The contention that this report demonstrates that BOC decided not to seek entry into the U.S. market is not borne out by the record. To begin with, BOC has quoted only a portion of the Perham-Greenfield report. The report, completed in February 1970, based its recommendation on low profit margins existing in the U.S. gases industry but went on to caution that its "generally negative conclusion is in relation to the foreseeable future and should not be considered final. Opportunities could rise in the future and a periodic review of the situation is recommended" (BOC RX 62B) (emphasis added). Subsequent to the Perham-Greenfield report, BOC did in fact continue to take an active interest in examining entry possibilities into the U.S. industrial gases industry.

(1) In April 1970, an investment banker approached BOC and advised that a fifty percent interest in Burdett Oxygen Company of Cleveland ("Burdett-Cleveland") was available. Although he noted that profits of the firm were negligible and that it did not appear a very attractive proposition, BOC nevertheless responded there was a possibility that it would be interested, but that an essential precondition to further study would be that BOC could obtain control (CX 233-34). After learning that control was not available, BOC told the banker it was not interested but if the situation changed it could be interested (CX 243).

(2) In August 1971, BOC's managing director discussed with Charles Perkins, president of Burdett Oxygen Company of Norristown, Pennsylvania (which has no present connection with Burdett of Cleveland) a proposal by Perkins that BOC enter the U.S. by acquiring Burdett and a number of other small independent gases companies. A memorandum of the conversation (which took place at BOC's offices in London) was made by the BOC official and copies were sent to other top BOC officials including the chairman of the board of BOC. Soon afterwards, BOC sent

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14/ The reference to a 15% pre-tax "requirement" return on capital was based on an "arbitrarily selected yardstick" of BOC management to set realistic limits to the study (BOC RX 181 C).

an executive to the United States to look over the company. The visit lasted three or four days during which the BOC representative made a thorough inspection of the books and records as well as the physical plant. Discussion and consideration was given to BOC's purchasing Burdett-Norristown with a group of other non-major industrial gases companies to effectuate a toehold entry into the U.S. market. The BOC official recommended to his superiors in a memorandum dated October 4, 1971 that:

> "If it is agreed both that BOC should make an entry into the industrial gases market in the USA and that this type of entry be adopted (from the small end upwards in the Canox manner) 15/, then Perkins, Burdett, and the group he proposes would in principle be a likely route...The companies he runs, if not financially healthy, have a reasonable trading foothold and can probably be made healthy. The other independents may well agree to his plan and his claims are broadly borne out by first checks" (CX 254-C).

Despite the visiting official's optimistic view of the company, BOC apparently regarded the company as too small to form the basis for long term expansion in the U.S. market. BOC informed the president of Burdett by letter that BOC had decided it was not then interested in acquiring the company. However the letter concluded that BOC was aware of the "sort of profits which can be made in the U.S. market and [we] are keenly interested to improve this awareness" (CX 117). 16/

15/ Canox, as previously noted, is the name of BOC's industrial gases firm in Canada. BOC entered the Canadian market by toehold acquisitions after World War II and is now the third largest firm in that market.

16/ Another incident took place after the Perham-Greenfield report. Dr. Albert Muller, a former consultant to BOC called by complaint counsel, testified that in 1970, subsequent to the Perham-Greenfield report, he and Mr. Perham, at the request of BOC, had meetings with the owner of Gardner Cryogenics, an American helium firm, as to the possible acquisition of that company by BOC (Tr. 671-80). This followed a study previously made by BOC of the possibility of acquiring that company (CX 15, CX 17). Although BOC claims its interest was only in acquiring this firm's European business, Dr. Muller testified that BOC was also interested in Gardner's United States operations (Tr. 676, 679, 709). Although the firm was not acquired, this incident corroborates the view that BOC had not closed the door on possible entry into the U.S. market because of the Perham-Greenfield report.

 (Footnote 16 continued on next page).

Feasibility of Entry. BOC claims that it would never enter the U.S. market but on a national scale and that it would cost about $240 million for it to have entered the U.S. market on such a scale had the Airco opportunity not presented itself. BOC's chairman testified that he could not conceive any circumstances in which BOC would ever expend that amount of money for entry into the United States.

This argument depends, however, upon an acceptance of self-serving testimony that BOC would never enter except on such a large scale. No reasons are presented as to why BOC would have to enter on a national scale. L'Air Liquide--a leading French firm--successfully entered the U.S. market through the purchase of a small regional firm in 1968. Subsequent to that acquisition, it purchased additional small regional companies and has constructed an air separation plant in the Seattle-Tacoma area and an acetylene plant in Houston and one in Los Angeles (CX 335 V-W, Tr. 528-530). At the time of the hearing it was expanding production capabilities in three additional areas of the country (Tr. 528). We have difficulty in perceiving why this international firm (which was the world's largest industrial gases firm before BOC acquired Airco) was able to enter on such a modest scale, yet BOC could not. 17/ The record indicates the existence of many small companies which could presumably be purchased in similar fashion.

We reject BOC's contention that before toehold entry can be considered as a procompetitive means of entry it must be shown that any of these firms was available at a reasonable price as of the time of the acquisition of Airco. Such a burden would be unrealistic. Also the fact that some of these firms may have sizeable shares of a local market in sales of a particular gas or group of gases would not disqualify them as permissible toehold candidates since the target market--the sole "relevant market" in this potential competition case--is the national industrial gases market. Regional producers had sales substantially below

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(Footnote 16 continued from previous page)

We do agree with BOC, however, that the additional conversations referred to in Findings 101 and 102 of the Initial Decision are not probative on the issue at hand.

17/ Noting that L'Air Liquide was expanding in the United States, a BOC official suggested (in 1969) that "despite the very large size of markets in the USA" there could be a "series of BOC ventures [entries] over the next, say, five to ten years..." He also suggested "some kind of joint venture, or series of joint ventures...if direct entry and acquisition are blocked." (CX 38 D, E).

10 percent of industry sales and one or more small firms presumably could have been acquired for purposes of subsequent expansion into a national or semi-national operation. See The Budd Co., FTC Docket No. 8848, Commission opinion, August 29, 1975. 18/

Industry experts suggested other ways by which entry could be achieved or an initial entry expanded. The chief executive officer for Air Products and Chemicals' gases operations who has been in the gases business for 22 years testified (Tr. 393-94):

> Q What method of entry do you believe the British Oxygen Company could have used to enter the United States market for industrial gases in late 1973?
>
> A ***[T]hey have already chosen one method which we, of course, know about. Other methods available, of course, are the construction of an air separation plant capable of producing liquid gas products, to serve a particular market area of the United States within economic distribution radius from the facility. They could bid for a base load pipeline gas supply opportunity from one of the merging new markets and then add incremental capacity to that facility in order to serve not only the base load customer, but the surrounding industrial market, or they could acquire one of the smaller regional producers and add new capacity to that regional producer's production capabilities and expand their market penetration that way.

Similar views were stated by the head of the Gas Products Department of the Linde Division of Union Carbide (Tr. 259-60).

An important ingredient of feasibility of entry is, of course, whether reasonable profits could be anticipated which would justify the expenditures necessary for BOC to make a de novo or toehold entry.

18/ Over twenty small regional firms were identified by witnesses. (We do not agree, however, with complaint counsel that Chemetron should be classified as a toehold firm, since its business was nearly nationwide and it had 10% of the national market. Nor would we regard Liquid Air as a permissible toehold firm since it was a rapidly expanding firm which had the financial backing to become a national producer. Cf. The Budd Co., supra.) Additional independent manufacturers were listed in a 1969 BOC staff report on the U.S. market, which stated "We believe that in actual fact there are approximately between 60-100 across the USA" (CX 44-Z-97).

If, for instance, the American market had been plagued by chronic overcapacity and extremely low profit margins, little incentive would exist for new entry. Although excess capacity existed in the 1960's, by 1973 conditions had changed substantially and there were shortages in the supply of air gases. By 1974 the market was buoyant; prices had firmed and industry was anticipating a yearly growth rate of up to 10 percent compounded annually over the next 5 years (Tr. 239, 246, 256, 391, 403, 438, 1941, 2716, 2719, 2723). 19/

By 1974 new applications for industrial gases in the United States were contributing to increasing demand. This has in part been due to the rise in prices of petroleum products. Industrial gases are now being used in the production of synthetic natural gas that can be used for commercial purposes or in power generation. The elevated price of oil has also led to the production of gas for pipeline transmission by the combustion of coal with oxygen. Additionally, industrial gases are now being used to generate chemical feedstock for the manufacture of fertilizers and methanol. These new applications have created demand for large tonnage plants by public utilities and chemical companies. The scarcity of natural gas has also made economically prohibitive the use of ammonia for generating nitrogen for metallurgical processes. This has increased demand for nitrogen produced by air separation.

Other new applications in the United States have been the development of nitrogen food freezing and the use of industrial gases in sewage treatment. Also the high price of scrap metal has resulted in steel companies using liquid pig metals to produce more steel rather than melting scrap. This has increased the requirement of steel companies for oxygen.

According to the witness from Air Products and Chemicals, the demand for principal industrial gases products, particularly tonnage oxygen, has increased to such an extent that the engineering and manufacturing capacity of the industry today is insufficient to meet the demand for construction of new plants (Tr. 2727). At

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19/ This is supported by the Department of Commerce which predicted industrial gases to be in a high demand through 1975 resulting in increased output and price rises. United States Industrial Outlook 1975, U.S. Department of Commerce (1974) pp. 98-99. (Official notice is taken of this publication).

the time of the hearing his company had recently told customers that it was unable to supply their requirements for new industrial gases plants. 20/ In addition, the witness from the Linde Division of Union Carbide testified that a number of industrial gases are in short supply and that Linde has had to allocate customers. Union Carbide announced that demand for industrial gases was "exceptionally strong in 1974, and exceeded Union Carbide's ability to supply even at capacity operation." Airco told its stockholders in 1974 that peak production had been maintained "to keep pace with developing tightness in the industrywide supply of bulk-liquid products," that there was "unprecedented demand" and record sales in 1973 were due to new uses of industrial gases. These companies are the three largest firms in the industry accounting for 60 percent of the nation's manufacturing capacity in industrial gases.

Based on the fact that BOC had the clear incentive to enter the U.S. market; that it had the technological, and managerial expertise necessary to effectuate such entry as well as having large capital resources; that it earlier entered the Canadian market; that it in fact considered possible acquisitions of small American firms; and that demand for industrial gases in the U.S. was outstripping capacity in 1973-1974 with indications that this is a long-term trend--we cannot accept the testimony of BOC's executives that under no circumstances would BOC attempt an entry into the market other than Airco acquisition. Where objective considerations so clearly favor probable entry, contrary testimony by company officials as to future intent has little probative force. See U.S. v. Falstaff Brewing Corp., 410 U.S. 526, 563-569 (concurring opinion); President's Task Force Report on Productivity and Competition ("Stigler Report") 5 CCH Trade Reg. Rep. ¶50,250 (1969) at 55,521 ("The identity of potential entrants should not be established by introspection"). Even apart from the fact that such testimony is inherently self-serving, it would represent, at best, only the current views of present management. Circumstances change, as does management. Even a firm that has once firmly rejected de novo or toehold entry in a market, preferring

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20/ BOC contends that this testimony was designedly misleading. However the witness' view of industry conditions is supported by a recent Department of Commerce report (publication cited in the preceding footnote) which states: "Shipments of all industrial gases will be limited because of lack of production capacity. New plants are being built, but completions scheduled for 1975 probably will not satisfy the rising demand for industrial gases."

(understandably) to enter by acquiring an established leader, may reconsider and enter if the latter route is blocked by antitrust action. 21/ Clearly the ALJ was correct in basing his findings on objective evidence and other facts of record rather than the testimony as to BOC's future intent.

Also we perceive no error in approaching the question of potential competition in this industry on the basis of assessing future probabilities and market trends. The Act contemplates this. "[C]ourts should look also to the size and growth prospects of the target market..." U.S. v. Marine Bancorporation, 418 U.S. 602, 642 (1974). "[R]ational rules applying to mergers that involve the possible loss of a new entrant should take the trend of demand into account." Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," 78 Harv. L. Rev. 1313, 1385 (1965).

If, despite the generally negative Perham-Greenfield report in early 1970, BOC still examined possible entry candidates later, there is every reason to believe that at the time of the acquisition, when the market had firmed up and major U.S. firms were not able to construct new plants at a pace to keep up with demand, BOC would be interested in entry. Simply because no entry had been effectuated at the time the Airco opportunity presented itself did not mean that BOC would not have eventually realized its "long-term objectives" of entering the U.S. market--by growth rather than by this major acquisition. The "premise of an antimerger statute such as §7 is that corporate growth by internal expansion is socially preferable to growth by acquisition." U.S. v. Philadelphia National Bank, 374 U.S. 321, 370 (1963).

We conclude that as of December 1973, there was a "reasonable probability" that BOC would have eventually entered the U.S. industrial gases market by internal expansion, or its equivalent, but for the acquisition of Airco, U.S. v. Penn-Olin Co., 378 U.S. 158, 175 (1964); Ekco Products Co. v. FTC, 347 F. 2d 745, 752-753 (7th Cir. 1965). In view of the trends in the market existing at the time of the hearings in 1974, and attested to by witnesses, the probability that BOC would enter the U.S. market in the future, if divestiture is ordered, has even increased.

21/ Such entry occurred after U.S. v. Bethlehem Steel Corp., 168 F. Supp. 576 (S.D.N.Y. 1958) was decided. See discussion infra.

E. The Question Reserved in Falstaff and Marine Bancorporation

Respondents contend that in the absence of BOC exerting any present fringe effect on the U.S. gases market, the possibility that BOC might have entered the market by some more procompetitive means is legally irrelevant.

The Supreme Court has expressly reserved decision on the question of whether an acquisition which has no immediate market effects except for the elimination of a future entrant can violate Section 7 of the Clayton Act. In U.S. v. Marine Bancorporation, supra at 625 (1974) the Court stated:

> "The Court has not previously resolved whether the potential-competition doctrine proscribes a market extension merger solely on the ground that such a merger eliminates the prospect for long-term deconcentration of an oligopolistic market that in theory might result if the acquiring firm were forbidden to enter except through a de novo undertaking or through the acquisition of a small existing entrant (a so-called foothold or toehold acquisition)."

See also id. at 639; and U.S. v. Falstaff Brewing Corp., 410 U.S. 526, 537 (1973). 22/

22/ Previous "potential competition" cases which have reached the Court have involved acquisitions which arguably reduced the pre-merger level of competition or raised entry barriers. See U.S. v. El Paso Natural Gas Co., 376 U.S. 651, 659 (1964); U.S. v. Penn-Olin Chemical Co. 378 U.S. 158, 174 (1964); U.S. v. Continental Can Co., 378 U.S. 441, 462-63 (1964); FTC v. Procter & Gamble Co., 386 U.S. 568 (1967). There is, however, dictum in several of those opinions suggesting that elimination of a future entry by the acquiring corporation into the acquired company's market is a type of foreclosure that is covered by Section 7 of the Clayton Act. See, e.g., FTC v. Procter & Gamble, supra at 575 ("If Procter had actually entered, Clorox's dominant position would have been eroded and the concentration of the industry reduced").

BOC urges that the Commission answer the question reserved in Marine Bancorporation and Falstaff by holding this acquisition to be lawful irrespective of whether BOC would have been likely to enter the U.S. market.

The Commission and lower courts have on several occasions expressed the view that foreclosure of likely or probably future competition between two merging firms can be the type of "effect" which "may be substantially to lessen competition" with the meaning of Section 7 of the Clayton Act. 23/

We find no persuasive reasons to depart from that line of authority. It is true that unlike a horizontal merger between actual competitors, a merger between potential competitors does not increase concentration, or reduce the number of firms, in a market. There would, however, be a decrease in concentration, and

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23/ Commission decisions: Foremost Dairies, Inc., 60 F.T.C. 944, 1084 (1962); Beatrice Foods Co., 67 F.T.C. 473, 717-722 (1965); The Bendix Corp., 77 F.T.C. 731, 817 (1970) reversed and remanded on other grounds, 450 F.2d 534 (6th Cir. 1971); Beatrice Foods Co., 81 F.T.C. 481, 528 (1972); General Mills, Inc., Dkt. 8836 (October 5, 1973); Beatrice Foods Co., Dkt. 8864 (July 1, 1975); The Budd Co., Dkt. 8848 (August 29, 1975).

Court decisions: U.S. v. Phillips Petroleum Co., 367 F. Supp. 1226, 1234 (C.D. Cal. 1973) aff'd without opinion, 418 U.S. 906 (1974); U.S. v. Joseph Schlitz Brewing Co., 253 F. Supp. 129, 147 (N.D. Cal. 1966), aff'd without opinion, 385 U.S. 37 (1966); U.S. v. Wilson Sporting Goods, 288 F. Supp. 543, 562 (N.D. Ill. 1968); U.S. v. Standard Oil Co., 253 F. Supp. 196, 227 (D.N.J. 1966); Ekco Products v. FTC, 347 F.2d 745, 752-53 (7th Cir. 1965). See also U.S. v. Bethlehem Steel Corp., 168 F. Supp. 576, 615 (S.D.N.Y. 1958).

increased pressures for competition, if the potential entrant entered by internal growth or its equivalent. 24/ Section 7 is as concerned with "preserving the possibility of eventual deconcentration" of oligopolistic markets as it is with preventing increases of concentration. U.S. v. Aluminum Co. of America, 377 U.S. 271, 279 (1964); U.S. v. Philadelphia National Bank, 374 U.S. 321, 365n.42 (1963). It is now settled that enforcement policy under Section 7 should be concerned not only with immediate effects on the market, but also with market conditions over the long

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24/ Respondents contend that the legislative history shows that Section 7 was designed only to prevent increases in concentration, citing from the Senate Report on H.R. 2734 (which upon passage amended Section 7 of the Clayton Act in 1950 to read in its present form) the statement that the purpose of the proposed bill was "to limit future increases in the level of economic concentration resulting from corporate mergers and acquisitions." The reference to "economic concentration" was to national aggregate concentration in the industrial sector which Congress feared was on the rise. It was not a statement that mergers which only raise concentration in a particular line of commerce were to be covered by the legislation. The 1950 amendment in fact removed language in Section 7 that appeared to limit its scope to acquisition of an existing competitor (the so-called "acquiring-acquired" test). U.S. v. Brown Shoe Co., supra, 370 U.S. at 317. See Narver, Conglomerate Mergers and Market Competition ch. 3 (1967) for evolution of the 1950 amendment with regard to conglomerate mergers.

It is certainly settled by Supreme Court decisions that Section 7 can be violated in ways that do not necessarily increase concentration in the relevant market. In addition to cases recognizing that Section 7 applies to mergers that make it difficult for new competitors to enter (e.g., Procter & Gamble, referred to in the above text), the Court's holding in U.S. v. Falstaff Brewing Corp., 410 U.S. 526 (1973), that elimination by merger of a perceived potential entrant may violate Section 7, in no way depended upon a likely increase in market concentration resulting from such a merger. Nor is a resulting "increase in concentration" the basis upon which vertical mergers have been held to violate Section 7. See, e.g., Brown Shoe Co., supra, 370 U.S. at 323-334; Antitrust Law Developments 76-78 (1975).

term so as to preserve opportunities for future entry and competition. This was clearly the import of the Court's decision in Procter & Gamble, supra, where the Court held the merger to be anticompetitive because it had the effect of deterring future entry. Although we have dismissed for want of evidence the charge that the BOC-Airco merger has further raised existing entry barriers, the removal of BOC as the most likely of a limited group of possible entrants into the market has the same, if not greater, adverse effect on prospects for future competition as the raising of entry barriers. Both effects reduce the likelihood that future entry will occur, thus entrenching the existing firms already in the market.

BOC contends that if the "actual potential entrant" doctrine is to be applied it should be confined to cases where "subjective" proof exists that the acquiring firm would have entered but for the acquisition. It is true that in giving weight to "objective" factors in determining whether a firm is likely to expand into a new geographical market, there is the possibility that the deciding tribunal will err. But "if justice requires the fact to be ascertained, the difficulty of doing so is no ground for refusing to try." O. Holmes, The Common Law 48 (1881). "Potential competition cannot be put to a subjective test. It is not 'susceptible of a ready and precise answer.'" U.S. v. Penn-Olin Co., 378 U.S. 158, 174 (1964). To follow BOC's suggestion and simply refuse to make any objective determination of the probabilities would leave the resolution of the legality of many large mergers to the self-serving testimony or documentation of company officials who stand to gain if the merger is permitted. A "wrong" decision, i.e. dismissal of the proceeding on the basis of erroneous statements as to the firm's ability and incentives to enter by internal rather than external growth, would mean the permanent loss of the firm as a future major competitive force in the market.

On the other hand, if objective considerations of the firm (its capability, incentives, and nearness to the market) and feasibility of entry sufficiently indicate that it would probably enter at some point by internal growth or a toehold acquisition--and the decision is made on that basis an erroneous decision will be far less apt to have any substantial adverse consequences on the marketplace.

That the antitrust laws should be concerned with elimination of "objective probable entrants" was demonstrated in the aftermath of U.S. v. Bethlehem Steel Corp., 168 F. Supp. 576 (S.D.N.Y. 1958), one of the first merger cases brought under §7 after it was amended in 1950. Bethlehem Steel, which was located primarily in the East, argued that it needed the ingot facilities of Youngstown's Chicago plant as a prerequisite to building new plate and structural shape mills in the Chicago area. Contending that the construction of an entirely new integrated plant in Chicago of the desired scale was not economically feasible, it presented figures showing the costs of a new plant greatly exceeded the cost of expanding Youngstown's existing plant. The District Court recognized that "it is undoubtedly easier and cheaper to acquire and develop existing plant capacity than to build entirely anew," and acknowledged both Youngstown's and Bethlehem's avowals that absent the merger neither would be able to build an integrated plant in the Chicago market. However, the Court found that the contentions, "which, of course, involve matters of business judgment and, in a sense, matters of preference," were "not persuasive in the light of their prior activities and history, their financial resources, their growth and demonstrated capacity through the years to meet the challenge of a constantly growing economy." Id at. 616. A few years after the decision disallowing the merger, Bethlehem built in that area what has been described as one of the country's most efficient steel plants. 25/

25/ Singer, Antitrust Economics 133 (1968):

> "Bethlehem may have accomplished, even more effectively than by merger, both the potential for vigorous upward competition against U.S. Steel, as well as the ability for strong downward competition against the smaller, less efficient steel producers. The District Court, by finding illegal the proposed merger between Bethlehem and Youngstown, encouraged the independent entry of new capacity in the Chicago area by Bethlehem."

F. Prospects for Future Competition in the Industrial Gases Industry

In U.S. v. Marine Bancorporation, supra, the Court held that by introducing evidence of high concentration ratios the Government established a prima facie case that the market was a candidate for the potential competition doctrine and that the burden was on the defending company to show that the concentration ratios do not accurately depict the competitive characteristics of the market, id. at 631.

Complaint counsel has clearly made such a prima facie case here. The industry is dominated by the three national companies--the Linde Division of Union Carbide, Air Products and Chemicals, and Airco. Together these three firms share 60 percent of production. Four-firm concentration is 70 percent and eight-firm over 85 percent with concentration being on the upswing in recent years (supra pp.10-11). The industrial gases industry has been classified as "highly concentrated," and is very close to being among the relatively few "extremely high concentrated" industries in the American economy. Adams, "Public Policy in a Free Enterprise Economy," The Structure of American Industry 467-69 (4th ed. 1971).

BOC argues that despite any prima facie case based on concentration ratios, the industry is competitive. In support of this it points to the fact that the "unit value" of many of the major industrial gases have dropped over the past several years as demonstrated from calculations derived from Census data. For example, the average unit value of shipments of oxygen dropped from $1,100 per million cubic feet in 1963 to $720 per million cubic feet in 1972, with the unit value of pipeline oxygen gas dropping from $700 per million cubic feet in 1963 to $480 per million cubic feet in 1972. Similarly, the average unit value of nitrogen dropped almost 20 percent from 1963 through 1972. The average unit value of carbon dioxide declined nearly 50 percent in that period and the unit value of argon dropped over 50 percent. BOC asserts that only for hydrogen has the unit value risen since 1963.

In contrast, BOC points out that the wholesale price index for all industrial commodities rose from 94.7 in 1963 to 117.9 in 1972. U.S. Bureau of the Census, Statistical Abstract of the United States 1973, Table No. 570, at 348.

For a number of reasons this argument, which has some superficial appeal, must be rejected. To begin with, the record shows that BOC is incorrect in stating that the unit value has risen only for hydrogen. The unit value of acetylene, an important industrial gas, increased 25 percent from 1963 to 1972 (BOC RX 190). The unit value of solid carbon dioxide has increased over that period (BOC RX 193). The unit value for cylinder and bulk oxygen in both gas and liquid form increased over that period (BOC RX 199). The unit value for nitrogen pipeline gas increased 13 percent between 1963 and 1972 (BOC RX 196). Thus, the unit value trend is quite a mixed picture.

But there is a more basic problem with BOC's argument. There are very decisive economies of scale in the production of gases from a tonnage plant. The record shows that in recent years the size of new air separation plants has increased substantially and BOC admits that as a result "there is no question that economies of scale in tonnage plants have led to lower unit costs." Thus, insofar as gases which are produced in large part from tonnage plants (oxygen, hydrogen, argon, and nitrogen), there has been a reduction of the unit value due to the declining unit costs in production. There is also an "averaging down" effect on measurements of average unit value of these gases.

BOC responds, however, that the lower unit costs have been passed on to customers in the form of lower prices. Although this is true for pipeline nitrogen (since 1966), pipeline oxygen, and argon--since the unit value for shipments of these particular gases has declined--there is no way of knowing from the record whether all or what portion of reduction in production costs has been passed on.

Respondents also rely on testimony by witnesses that competition was and has remained "vigorous" and "strong" in the industry. Although there is evidence of price competition during the 1960's, when the industry was plagued by over-capacity due to circumstances unforeseen by the industry, general and vague statements cited by

respondent are too equivocal to be probative on the degree and scope of competition existing during the time of the acquisition. 26/ No actual price data were put in record by respondent and the evidence that is in the record indicates that demand has caught up with supply (and has exceeded supply in some areas). "Prices have gradually firmed up," one executive testified, "because the industry's practice back in the early 1970s was that they had excess capacity and they were using a kind of a marginal pricing philosophy.... As demand firmed up, marginal costing and marginal pricing disappeared and full costing and full pricing became the standard..." (Tr. 2723). Other witnesses agreed that air gases such as oxygen and nitrogen have been in short supply since 1971 and, as previously noted (supra p. 25) this trend is expected to continue.

26/ Respondent, for instance, quotes the testimony by the President of Liquid Air, Inc. that there has been "vigorous" price competition in the industry. When asked what "vigorous" meant, he replied "High enough to make a profit"--clearly a non-sequitur (Tr. 556). The witness from Union Carbide testified "I would say there is a fair amount of vigorous price competition" (Tr. 305, emphasis added). These and other general expressions of subjective opinions by industry witnesses cannot be given much weight, particularly in view of the rarity with which industry witnesses, in our experience, ever acknowledge the absence of vigorous competition in any form.

There is documentary evidence in the record that supports a finding that in 1966-1967 Union Carbide lost sales and market share because it raised prices but other firms did not follow (CX 232-Z-24, CX 232-S). Also the 1970 Perham-Greenfield study reported that industrial gases had become a commodity in the U.S.A. "and as a result are sold essentially on price" with the result being a depressed industry at that time or earlier. Although the study observed that there were current attempts to increase prices, the authors did not believe the increases would keep pace with inflation. However, as the above text indicates, by 1973 prices had firmed up and in June 1973 BOC started laying the groundwork for a takeover of BOC.

There are also indications that the industry may tend towards parallel pricing practices. Thus, during the hearings in April 1974 Linde Division increased prices 10 to 15 percent. Airco immediately followed within a day or so with a price increase (Tr. 314).

Economists teach us that in a high fixed-cost industry, leading firms are prone to avoid overt price competition. Scherer, Industrial Market Structure and Economic Performance 195 (1970); Neal, Industrial Concentration and Price Inflexibility 77 (1942). The record supports this view with respect to the instant case. A BOC document reveals that at a private meeting on September 6, 1973, a representative from one of the three dominant U.S. industrial gases firms told BOC's chairman that with respect to the U.S. industrial gases market, "the U.S. gas market has stabilized and that the three main competitors no longer encroach on each other's area of domination" (CX 95D).

Although current profit figures were not put in the record by BOC, indications are that profits have been rising. 27/ In a statement to shareholders, Airco announced that the "1972 earnings performance of our Industrial Gases, Welding Products and Electronics Divisions was Outstanding" (CX 85X). Airco also stated to BOC during their July 1973 discussions that their "after tax return is better than AP [Air Products] or Linde: [for example] CO-2 is estimated to give a 10% after tax return" (CX 93E). A BOC staff document drafted in June 1973 for consideration by the BOC chairman and managing directors advised that although "...the general level of profitability in the leading industrial gases firms in the USA was poor throughout the 1960's, there is evidence that it is improving now and likely to establish a better plateau for the middle/later 1970's;" and that "skilful managements earned acceptable returns." It noted instances of two United States industrial gases firms having relatively high profit returns according to data published in Fortune (CX 76B-C).

27/ A composite average of three firms' profit margin on sales between 1970 and 1972 placed in the record by BOC reveals there was a 46% gain from 4.92% to 7.17% (BOC RX 254). Although the consolidated rate of return on investment never exceeded 3% during that period, investment was calculated on the basis of "gross fixed plants and equipment" not taking into account depreciation (ibid). Exclusion of such an important reduction of the capital base in a capital-intensive industry would result in a substantial understatement of return compared to commonly accepted rates of return.

BOC contends, however, that the threat of backward integration of tonnage users, e.g., steel and chemical companies, will cause industrial gases suppliers to perform in a competitive manner. It argues that when a gases company bids on a tonnage supply contract it knows that the customer may consider purchasing his own plant as an alternative and this fact prevents the bidder from charging more than a reasonable rate of return. While there may be some check placed on profit margins on tonnage supply contracts as a result of the threat of vertical integration, this would not assure that prices and profits will not exceed a competitive level. To begin with, it is only for certain gases, particularly oxygen, where a single customer consumes quantities justifying an on-site tonnage plant that there is any real economic impetus for some customers to consider owning their own captive source of supply. Furthermore, any company that decided to integrate backward to produce its own oxygen would undoubtedly incur higher unit costs than an industrial gases company since the latter is frequently able to recoup a portion of costs by sale in the merchant market of nitrogen and argon which can be produced simultaneously in the air separation plant. Large users of gases historically have not found it feasible to enter into the industrial gases business. See also discussion of entry barriers, supra, pp. 14, 19 & n.13. Finally, as the ALJ pointed out, any restraining effect on prices by the threat of backward integration would have little effect on prices in the merchant market. Prices for oxygen in the merchant market, for instance, are in the order of five to ten times the price of tonnage oxygen. The marginal potential contribution to the supply side of the merchant market, which is apt to be limited in geographic availability depending on the location of such customer, is unlikely to have a significant impact on that price level.

In sum, we fail to find convincing reasons to view entry by BOC as lacking competitive significance for this industry. Entry by BOC by internal growth (or expansion of toehold firm) would add a new competitor and decision-maker to an industry that is already highly concentrated and becoming more so. New entry into another geographical market by a strong, proven-and-tried competitor frequently has the effect of shaking up established industry leaders and sets in motion pressures on them to compete more vigorously in price or services in order to retain their existing market shares.

We conclude that that Section 7 has been violated and BOC should be ordered to divest itself of Airco.

II. INHALATION ANESTHETIC EQUIPMENT

The complaint also alleges that one of the effects of the acquisition of Airco stock may be substantially to lessen competition in the manufacture and sale of inhalation anesthetic equipment, or any submarket thereof, in the United States. "Inhalation anesthetic equipment" was defined by complaint counsel during the proceedings as equipment and accessories used in the administration of gas for anesthetic purposes. It is to be distinguished from equipment designed to aid patients in breathing ("inhalation therapy equipment"). The principal items of anesthetic equipment are anesthesia machines, vaporizers, face masks, ventilators, flow meters, and various connecting tubes. Many of these items are similar to "inhalation therapy equipment," except that they must be semi-conductive to prevent accidental electrocution or explosions in the operating room. This results in prices being higher than on corresponding therapy equipment.

At the time of the acquisition, Airco, through its Ohio Medical Products Division, was the leading seller of inhalation anesthetic equipment in the United States. BOC, through two U.S. subsidiaries, Fraser Sweatman, Inc. and Harris-Lake, Inc. 28/, also marketed certain types of inhalation anesthetic equipment.

28/ Fraser Sweatman was the U.S. subsidiary of Cyprane, Ltd., a United Kingdom company which was acquired by BOC in 1972. Harris Lake, Inc. was the subsidiary of Harris Calorific Company, a United States company, full control of which was acquired by BOC in November 1973.

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The ALJ found that total sales of inhalation anesthetic equipment in the United States in 1972 was $24,305,611. Airco's share of those was approximately 31 percent ($7,616,338). The share collectively held by firms acquired by BOC amounted to 8 percent ($2,013,362). The ALJ also found that sales were highly concentrated, the four largest manufacturers in 1972 having captured 64.5 percent of total sales and the eight largest, 88 percent. The ALJ found that the manufacture and sale of inhalation anesthetic equipment constituted a separate product market and the acquisition of Airco stock by BOC substantially lessened competition in that line of commerce.

BOC's threshold challenge to this portion of the Initial Decision is with respect to the definition of the product market and the completeness of sales data placed in the record.

A. Inhalation Anesthetic Equipment and Accessories as a Line of Commerce

Both here and before the ALJ, BOC has objected to the market definition as being too broad. A review of the specific items encompassed within the asserted market demonstrates that there is lack of interchangeability, and therefore lack of competition between or among the items. 29/

29/ Included in the Initial Decision's market are the following items: (1) "Anesthesia machines" (the essential elements of which are a cart, regulators, flow meters, vaporizers, conducting tubes, masks, CO2 absorption canisters, and rebreathing reservoir bags); (2) anesthesia vaporizers (containers that convert a liquid anesthetic into a vapor); (3) rebreathing reservoir bags; (4) anesthesia conducting tubes that carry the gas from the anesthesia machine to the patient; (5) anesthesia airways (curved tubes inserted into a patient's mouth), (6) anesthesia face masks; (7) connecting Y-pieces; (8) adapters and fittings; (9) carbon dioxide absorption canisters; (10) flow meters; (11) yokes, handscrews, and valves; (12) anesthesia ventilators (devices which mechanically assist a patient's breathing during anesthesia); (13) anesthesia respirometers (measures volume of breathing); (14) endotracheal tubes and cuffs; (15) laryngoscopes for anesthesia; (16) forceps for anesthesia; (17) disposable breathing circuits; (18) other miscellaneous anesthesia accessories. The market as defined encompasses equipment whether sold for use in hospitals, by the veterinary profession, or the dental profession.

The ALJ responded that (1) the principal item, the anesthesia machine, "consists of nearly every product" in the asserted market; and (2) the remaining items in the asserted market are necessary in order for the patient to effectively receive the anesthetic vapors. 30/

While these facts may be true, they do not establish that production and sale of all inhalation anesthetic equipment are in a single economic market. Automobiles "consist of" tires, mufflers, spark plugs, etc., but this does not mean that the production of automobiles may be lumped with the production of all tires, mufflers, etc., into a single product market. Automotive parts that are sold separate and apart from the sale of automobiles (aftermarket sales) obviously are not in the same market as assembled automobiles. So it is with inhalation equipment. A purchaser may buy a completed "anesthesia machine" from one manufacturer but purchasers also buy separate components from different manufacturers. Table I of the ALJ's findings disclose that only eight of the 23 firms whose output is included in the total market manufacture and sell anesthesia machines; and anesthesia machine sales represent only 22 percent of total inhalation anesthetic equipment sales. The ALJ's second point -- complementarity in end use among the products--does not establish that the products belong in the same economic market. Automobiles need oil and gasoline to be operable, but no one would surely contend that automobiles, oil, and gasoline are all in the same product market.

On appeal complaint counsel seek to bolster the ALJ's finding on the ground that inhalation anesthetic equipment is a "cluster" market within the meaning of U.S. v. Philadelphia National Bank, 374 U.S. 321, 356-7 (1963); A.G. Spalding & Bros., Inc., 56 FTC 1125 (1960), aff'd, 301 F. 2d 585 (3d Cir. 1962) and U.S. v. Bethlehem Steel Corp., 168 F. Supp. 576 (S.D.N.Y. 1958). But as we pointed out in Sterling Drug, Inc. 80 FTC 477, 595 n.19

30/ The ALJ found that there is a degree of interchangeability, both in the supply side (technological similarity leading to production flexibility) and the demand side among surgical, veterinary, and dental anesthesia machines. Although BOC disputes this finding, we find the record supports the inclusion of veterinary and dental machine production output capacity in the same market with surgical machines. The machines are very similar in their makeup and the principles of producing them are the same. Many of the components are identical. Cf. The Budd Co., Dkt. 8848, Commission Opinion, August 29, 1975; Beatrice Foods Co., Dkt. 8864, Commission Opinion, July 1, 1975.

(1972) in "those cases it was established or undisputed that resource flexibility existed or that the product groupings were sold as a full line by most firms." See also U.S. v. Grinnell Corp., 384 U.S. 563, 572 (1966). It is not asserted by complaint counsel that there is ease of production flexibility such that any manufacturer of one item within the product grouping can readily manufacture any of the other items from existing facilities. 31/ And unlike the "industrial gases", which we found to constitute a single line of commerce, there is no evidence that manufacturers offer a full or nearly full line of such products. Only 4 of the 23 companies in the asserted inhalation anesthetic equipment market produce as many as half of the items making up the asserted market and none of the companies make all of them. Even among the four companies having the greatest volume of overall sales, two made less than half of the items. Although some manufacturers apparently serve as primary suppliers of certain equipment to other firms which resell them as part of a broader line of inhalation equipment, the record does not show the extent this occurs and complaint counsel's market is limited to sales at the manufacturing and import level. Also unlike the record with respect to the industrial gases industry, there is no evidence that the manufacture of "inhalation anesthetic equipment" is viewed as a distinct industry. On the basis of this record, we cannot agree that the manufacture of all inhalation anesthetic equipment constitutes a single economic market.

The ALJ based his decision on the existence of such an overall market and apparently did not deem it necessary to consider whether competition was substantially lessened in submarkets of the asserted overall market, although this was pleaded in the complaint. Sales data on a product-by-product basis were placed in the record and we have calculated the following market shares of BOC and Airco in the three product lines in which both competed to a significant degree, measured in terms of dollar sales at the manufacturing level in 1972.

31/ It appears that the products can be grouped into three types of production processes; production of rubber goods, production of plastic goods, and production of metal goods by machine shop tools and foundry castings. BOC's contention that there is no cross-elasticity of production facilities across these categories is not challenged by complaint counsel.

Sales ($)		Market Share
	Anesthesia Machines	
All	5,229,834	100%
Airco	2,413,231	46%
BOC	822,888	16%
	Anesthesia Vaporizers	
All	1,109,951	100%
Airco	273,712	25%
BOC	579,495	52%
	Anesthesia Face Masks	
All	1,170,623	100%
Airco	1,035,901	88%
BOC	36,275 32/	3%

Although BOC maintains that the market share data with regard to inhalation equipment are incomplete, we are satisfied that they are a sufficiently reliable basis for measuring concentration and market shares with regard to the above product lines. For instance, in its own analysis of the anesthesia machine market BOC placed Airco as dominating sales "with approximately 55-60% of the market" (CX 169B). Testimony by knowledgeable industry witnesses indicated that at least 90 percent of industry sales were accounted for by the 23 firms listed by complaint counsel as selling inhalation anesthetic equipment. Recognizing that "the development of precise market data could be 'prohibitively expensive and burdensome to obtain' in industries characterized by a central core of firms surrounded by a fringe of much smaller competitors," the Commission has accepted the Supreme Court's teaching in Brown Shoe that "precision in detail is less important than the accuracy of the broad picture." Avnet, 82 FTC 391, 465, aff'd, 511 F. 2d 70 (7th Cir. 1975); Papercraft Corp., 78 FTC 1352, 1405-06 (1971), aff'd, 472 F. 2d 927 (7th Cir. 1973); see Brown Shoe Co., v. U.S., 370 U.S. 294, 342 n.69 (1962). We find that the above tabulations reflect the approximate size of these product markets.

32/ $36,275 is the figure listed in the Initial Decision. However it understates the degree of actual competition between BOC and Airco since Harris-Lake (BOC) reported sales of face masks of $76,942 in 1972 although they were manufactured for them by another firm.

Clearly in these three product lines the challenged acquisition has substantially lessened competition. In addition to being the two largest manufacturers of anesthesia machines, BOC and Airco are number one and number two, respectively, in the manufacture and sale of anesthesia vaporizers. Although BOC challenges the ALJ's findings that entry barriers in inhalation anesthetic equipment are high, when such substantial market shares are held by participants in a horizontal merger, lack of high entry barriers is not a defense in any event. Absence of substantial entry barriers does not itself ensure that lost competition will be restored. Ekco Product Co., 65 FTC 1163, 1208-09 (1964), aff'd, 347 F. 2d 745 (7th Cir. 1965); American Brake Shoe Co., 73 FTC 610, 684-85 (1968), aff'd, 420 F. 2d 928 (6th Cir.). See also Brodley, "Oligopoly Power Under the Sherman and Clayton Acts" 19 Stan. L. Rev. 285, 349 (1967). Furthermore the record amply supports the ALJ's findings that significant entry barriers exist.

III. INHALATION THERAPY EQUIPMENT

The complaint also alleges that competition may be substantially foreclosed in the manufacture or sale of "inhalation therapy equipment" or submarkets thereof. Inhalation therapy equipment is defined by complaint counsel as equipment used to aid patients to breathe, rather than to anesthetize them.

As in the case on inhalation anesthetic equipment, the alleged product market consists of a wide variety of equipment which are mostly nonsubstitutable and are generally made by different production methods. 33/ Production of the various

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33/ The ALJ found the following items as comprising the inhalation therapy equipment market: (1) ventilators (sometimes called respirators) which force air or oxygen into the patients lungs; (2) humidifiers and nebulizers, which humidify the air or oxygen; (3) resuscitators (emergency devices); (4) delivery tubing; (5) face masks; (6) flow meters; (7) nasopharyngeal catheters and cannulae; (8) oropharyngeal airways; (9) drain and condensation bottles; (10) adapters and fittings; (11) yokes, handscrews and valves; (12) respirometers; (13) bacteria filters; (14) tracheotomy tubes; (15) incubators used to control or assist in breathing; (16) oxygen tents; (17) IPPB (intermittent positive pressure breathing devices).

equipment is fragmented among many different companies. The Initial Decision lists some 30 firms in the field and one witness stated that his company had identified some 59 companies making one or more pieces of such equipment. The majority of firms have sales under $1 million. None of the companies manufactures all items of inhalation therapy equipment. Among the four firms having the greatest aggregate sales, only two manufacture as many as half the items. Although Airco manufactures 10 out of the 16 types of equipment comprising the market, the BOC firms manufactured at most only two types. As in the case of inhalation anesthetic equipment there is a failure to demonstrate that the leading firms manufacture a full or nearly full line of inhalation equipment. 34/ Accordingly, we conclude that it has not been established that the manufacture of inhalation therapy equipment constitutes a single, overall market. 35/

34/ Therefore the so-called "cluster market" cases cited by complaint counsel are unavailing. In Philadelphia National Bank, supra, there was no dispute that commercial banks offered the various services that make up "commercial banking." In Bethlehem Steel, supra, the major producers, including the two merging firms, produced the cluster of iron and steel products accepted as an alternative market in that case. In Spalding, supra, the leading firms, including the two merging firms, sold athletic equipment as a full line to retail distributors. See also U.S. v. Grinnell Corp., 384 U.S. at 572 n.6, where the Court in holding that a "cluster of services" market had been demonstrated cited the fact that 24 out of the 38 firms offered a full line of the four types of central service station protection services, and nearly all the remaining firms offered three out of four of the services.

35/ Even if such a market definition were accepted, we would probably have difficulty upholding a violation in that line of commerce. Airco had approximately 10 percent of total sales. The BOC firms, however, accounted for about one-half of one percent of sales.

Turning to the individual product lines comprising inhalation therapy equipment, there is no evidence of any significant competition between Airco and BOC. BOC's sales in this field were virtually limited to respirometers and Airco did not manufacture this item. As to the possibility that potential competition may have been eliminated or lessened, complaint counsel stated during the hearing that they were basing their case in inhalation therapy equipment solely on the foreclosure of "actual" competition between the firms, not on any charge that BOC's importance to the market was due to future entry on a much grander scale. Respondent's counsel clearly relied on complaint counsel's statement and refrained from eliciting testimony relating to any issue of potential entry.

Accordingly, the allegation that both actual and potential competition in inhalation therapy equipment or submarkets thereof have been substantially diminished as a result of the BOC acquisition of Airco stock must be dismissed.

IV AIRCO

Although Airco did not enter into an agreement to sell its assets to BOC (compare Dean Foods Co., 70 FTC 1146, 1292 (1966)), by certain actions and agreements detailed above, supra p. 4, Airco's board of directors facilitated BOC's acquisition of Airco stock. Thus Airco's board, in exchange for Airco's representation on BOC's board of directors, consented to BOC's tender offer for Airco shares and advised Airco's shareholders of their consent and that a closer association of Airco and BOC would be beneficial to Airco. These actions technically constituted violations of the Federal Trade Commission Act since they were intended to, and did, facilitate an acquisition of stock that violated Section 7 of the Clayton Act. Were it not for the fact that Airco should be subject to certain provisions of the order to restore Airco's independence from BOC control, it would probably not be necessary to retain Airco as a respondent in this proceeding. Nevertheless the joinder appears desirable for purposes of assuring that certain pre-acquisition agreements between Airco and BOC are rescinded, 36/ and we shall not disturb the ALJ's findings that Airco violated the Federal Trade Commission Act with respect to the acquisition.

36/ Had Airco not been joined as a respondent in this proceeding, a finding of violation of Section 7 and an order of divestiture against BOC might nevertheless supercede and render unenforceable these agreements between Airco and BOC. However, we need not reach this question.

V. RELIEF

The ALJ ordered BOC to divest its stock in Airco within one year. In addition he required BOC to assign its stock to a voting trustee who would vote the Airco stock pending divestiture. This latter provision, which was not sought by complaint counsel, is not necessary in our estimation unless future events dictate the need for such trusteeship to accomplish divestiture. Cf. U.S. v. Kennecott Copper Corp., 249 F. Supp. 154, 165 (S.D.N.Y. 1965). Accordingly, it will be deleted. We do not agree with BOC that the one year period for divestiture is too short.

The ALJ's order also prohibits BOC from acquiring, directly or indirectly, during the next 10 years, the business of any firm engaged in the business of industrial gases without approval of the Federal Trade Commission. Since requirement of advance Commission approval of acquisitions in this field might make it difficult for BOC to compete for the acquisition of a toehold firm as a basis for future entry should an occasion arise where the owner is attempting to sell his company quickly, we shall permit the acquisition of a firm selling less than $25 million a year in industrial gases without the requirement of obtaining Commission approval. 37/ We will, however, require BOC to obtain Commission approval before acquiring any company engaged in the manufacture or sale of anesthesia machines, anesthesia vaporizers, or anesthesia face masks since BOC is already engaged in those lines of commerce in the United States.

The ALJ's order also appropriately requires BOC and Airco to cease any representation on each other's respective boards of directors. In addition the order requires Airco to cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of December 10, 1973. We think the latter provision is unnecessarily broad in one respect. Airco's "right of first refusal" allows Airco to purchase or designate a purchaser for such shares in whole for cash in an amount equivalent in value to the consideration for which BOC proposes

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37/ Based on 1972 Census data, shipments totaling $25 million would represent approximately 4 percent of the national market.

to sell such shares to a transferee (CX 108 B). If the Airco corporation itself should purchase back the acquired stock, the ownership of Airco would be in approximately the same status as prior to the BOC takeover. On the other hand, if Airco should seek to designate a purchaser, there should be no objection provided sale to the designee does not raise antitrust problems. No reasons have been presented by complaint counsel as to why Airco should not have an opportunity to exercise this right subject to Commission approval of the designee.

As to a second point raised by Airco--the desirability of retaining the provision contained in the July 25 agreement that restricts BOC from disseminating certain confidential Airco business information--complaint counsel has offered no objection to this suggested change and we cannot perceive any. Accordingly the order will be modified in this respect also.

An appropriate order accompanies this opinion.